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A Statistical Study of a Group of Specialized Office Workers

By Arthur W. Kornhauser, *University of Chicago*

THE inquiry reported in this paper is concerned with the personal qualifications and efficiency records of several hundred Elliott-Fisher bookkeeping machine operators employed in the offices of a large public service corporation. Information regarding these individual workers is analyzed with the aim of discovering relations that may suggest possible improvements in employment practices.

This study is presented here primarily as an example of a method. Interest does not lie so much in the special occupation used or in the conclusions reached as in the illustration of a kind of inquiry which is of general applicability and usefulness. Research studies in employment practice have commonly concerned themselves with turnover in a particular occupation, or with the success of particular tests, or with some other more or less single and separate item of investigation. The thing we wish to point to is the additional value resident in a more varied and many-sided study of a job in all its employment aspects. The present study merely looks in that direction. A *complete* study of a special occupation or job from this point of view would be a formidable undertaking, requiring perhaps months, perhaps years. It is not identical with a job analysis. Attention is directed rather to the people in the job than to the work itself (though the two necessarily go hand in hand), and particularly to the qualifications of the workers and other information of use in guiding practices of selection and retention for the job. The material in the following pages is not at all a general or adequate illustration of the sort of study suggested. It gives only a hint of the lines along which such studies might proceed, and contains a few examples of the modes of analysis involved.

Since we are not primarily interested in the particular occupation studied, only a brief general statement is needed as to the nature of the machine billing operations in which the group is engaged. The billing machine is a simplified combination of adding machine and typewriter. It is specially adapted to make entries of the sort needed on bills and ledger accounts, and automatically to perform part of the computation. Billers in the group studied have continuous and fairly uniform work, billing one account after another in a routine fashion. On the average, 35 to 40 accounts per hour are typed by the experienced billers. Each account involves some 10 or 12 separate entries, and one of the steps necessitates a mental calculation which

at times is fairly complex. Regarding operators for machine billing, a committee report of the National Electric Light Association[1] states:

> New operators should have a high school education, but do not have to have a knowledge of billing machines or the bookkeeping system. When a new clerk enters the machine billing division, he is turned over to a machine instructor who understands the system thoroughly. While the student is practicing on the machine, he is also spending a portion of his time studying the methods of billing. A regular course of ten lessons has been arranged, ranging from elementary electricity to our most complicated rate schedules. This course is given by an instructor, who works in conjunction with the machine instructor, so that in from two to three weeks, an operator is ready to go on the regular billing.

Operators are paid a basic wage plus a bonus based upon the records of both speed and accuracy in billing.

In undertaking the study of machine billers, we stated our general problem in this way: Some billers are more efficient and more desirable employees than others. Can we find a few of the measurable differences that bring about this greater efficiency? In other words, can we predict the future value of the biller on the basis of information obtained at the time of employment, or early in the employee's period of service with the company?

Our inquiry is related to such specific questions as: (1) What kind of people should be hired—Men or girls? High school graduates or common school graduates? Young persons or older ones? People of high general ability or routine workers who are content to stay on repetitive work? (2) What indications of later ability can be gotten from the production records during the earlier months of employment? What is the typical rate of improvement in machine billing? What is the relation of increasing speed to increasing accuracy? (3) What results of value may be derived from the use of psychological tests and rating scales? Do certain abilities or characteristics appear to be especially closely related to success in the work?

In an attempt to find answers to some of these questions, records of billing machine operators at work in 1920 and 1921 were analyzed. From the records of the billers at work in 1920 (379 in number) the following items of information were obtained: Production records (speed and accuracy) by months; duration of employment in the case of workers who left the Company, and their reason for leaving; sex; age; schooling; previous experience. In November, 1920 the general plan of work of the billers was greatly modified by having all the mental calculations performed as a separate operation before the books were delivered to the machine operators. Our second set of records was taken, accordingly, from the 1921 group of billers working under the new system. With respect to this group, who numbered 32, the following items were obtained: Production records (speed and accuracy) by months; sex; age; schooling; psychological test scores; ratings on a number of characteristics by supervisors. An analysis of these several items of information constitutes the main portion of this paper.

[1] Report of Committee on Customers' Records and Billing Methods, Forty-third Convention of the National Electric Light Association, Pasadena, California, May, 1920.

ANALYSIS OF DATA—1920 GROUP OF BILLING MACHINE OPERATORS

We shall ask ourselves three questions in regard to this group of workers: (1) What is the relation of the individuals' efficiency to their personal characteristics such as sex, age, schooling, and previous experience? In other words, can we predict in any degree the future value of the individuals on the basis of these items of personal information available at the time of employment? (2) What is the relation of turnover to personal characteristics? In other words, do certain kinds of billers leave sooner or in greater numbers than others, and if so, what are their special characteristics? (3) What is the relation of individual production and of turnover to records of the individuals' production in earlier months of employment? In other words, can we predict the future value of operators on the basis of their production records during the first few months?

Clearly, all three of these questions deal directly with the problem of knowing what kind of people to hire and which ones to retain. The results turn out to be in the main negative. That is to say, none of the relations suggested in the preceding paragraph prove to be close enough to make possible very accurate predictions of the future value of billers. Negative findings are not void of significance, however. It is important for employment interviewers to know what characteristics *not* to rely upon as well as what ones are useful. The conclusions are more fully discussed at the end of our analysis.

1. Efficiency of production in relation to sex, age, schooling, and previous experience

Our question in this section is: How far are we able to tell what an individual's efficiency is by knowing his sex, age, schooling, and previous experience? In attempting to answer this question, we shall divide the billers into two divisions: (a) those whose records extend over six months or more, and (b) those whose records extend over less than a six months period of employment. And since efficiency of production is measured both by speed and accuracy, we shall also consider these separately, dealing under both (a) and (b) first with speed and second with accuracy.

(a) *Comparisons within the group of workers remaining six months or more.* (fifty-seven individuals began work in 1920 and remained six months or more.)

(1) Speed. A general index of speed of billing was calculated for each individual from the records showing his average number of accounts per hour by months for the first six months of employment.

Briefly, this general index was gotten as follows: Since we found that, on the average, there was little improvement after the first six months, we took the speed at the sixth month as a basis or point of reference for our evaluations of the speeds at the other months. The average speed for the first month was 22.5; for the sixth month it was 40.8, which is 1.8 times as great as for the first month. Hence in each case we multiplied the first month's speed record by 1.8 to bring it to a sixth month basis. Similarly, each second month record was multiplied by 1.5 and so on. The six corrected monthly records were

then averaged to obtain the general index of speed for each individual. These final speed measures vary from 29 accounts per hour to 67 accounts per hour. (A special difficulty was presented by the fact that all accounts are not equal in the time they require. It was accordingly necessary to make certain allowances to place all records on a comparable basis. The details of this weighting we need not describe here.)

These speed indexes as measures of individual efficiency were then compared with the items of sex, age, schooling, and experience. The average results of these comparisons are summarized in table I.

None of the differences are striking and the number of individuals is so small as to make the differences highly unreliable. A summary of the more significant relations that are indicated by this and subsequent tables will be made after we have examined the data for both speed and accuracy for both the group of workers remaining six months and those having records for less than six months.

(2) Accuracy. General indexes of accuracy were obtained precisely as were those for speed, and similar comparisons have been made. The average results for accuracy are summarized in table II. Probably none of these differences in accuracy as affected by sex, age, etc., are great enough to have certain significance. The relationships suggested by the table will be summarized later in conjunction with other similar comparisons.

(b) *Comparisons within the group of workers remaining less than six months.* (Eighty-seven individuals began work in 1920 for whom we have records for from one month to five months.)

(1) Speed. A general index of speed of billing was obtained for each individual as was done in the case of the six month group. Comparisons were then made between the speed indexes and the items of sex, age, schooling, and experience as in the case of the other group. (These comparisons were first made separately for individuals working one month, those working two months, etc. Since the differences between these groups were not significantly large, they were all pooled and only the combined results are given here.) The comparisons were made omitting all individuals who left work to return to school, since this group of vacation workers might appear exceptional and thus lead to unwarranted conclusions as to the relationships being studied. The relations proved to be approximately the same with vacation workers included as when they were omitted. The comparisons with vacation workers omitted are shown in table III.

As was true of the six month group (table I), none of the differences are large enough to carry much weight. As regards sex, schooling, and experience, the slight differences that are shown are not in the same direction as those found among the individuals remaining six months or more.

(2) Accuracy. The comparisons in accuracy of the individuals working less than six months are shown in table IV. (As in the case of speed comparisons, the individuals who returned to school have been omitted.) The differences are again small and not readily explained.

As a general conclusion, now, based upon all the comparisons that have

TABLE I

Relation of speed records to sex, age, schooling, and experience, for billing machine operators working six months or more

COMPARISONS OF SPEED RECORDS WITH:		NUMBER OF INDIVIDUALS	AVERAGE SPEED INDEXES		
			Girls	Men	Total
Sex	Girls	31			37
	Men	26			42
Age (years)	16–18	23	39	39	39
	19–21	25	35	44	37
	22–	8	34	39	37
Schooling (grades completed)	6–10	16	35	44	41
	10.5–11.5	14	39	42	39
	12–15	24	36	42	39
Experience in office work (years)	None	10	35	47	37
	0–1	21	35	40	39
	1–	23	39	43	39

TABLE II

Relation of accuracy records to sex, age, schooling, and experience, for billing machine operators working six months or more

COMPARISONS OF ACCURACY RECORDS WITH:		NUMBER OF INDIVIDUALS	AVERAGE ACCURACY INDEXES* (ERROR PERCENTAGE)		
			Girls	Men	Total
Sex	Girls	31			2.2
	Men	26			2.6
Age (years)	16–18	23	2.2	2.5	2.4
	19–21	25	2.2	2.8	2.4
	22–	8	2.4	2.6	2.5
Schooling (grades completed)	6–10	16	1.6	2.2	2.0
	10.5–11.5	14	2.4	2.8	2.4
	12–15	24	2.4	2.6	2.4
Experience in office work (years)	None	10	1.8	1.9	1.8
	0–1	21	2.4	2.8	2.6
	1–	23	2.2	1.8	2.0

* Attention is called to the fact that the accuracy index is really an index of percent of errors. Hence greater accuracy is indicated by *lower* indexes.

TABLE III

Relation of speed records to sex, age, schooling, and experience, for billing machine operators working less than six months (vacation workers omitted)

COMPARISONS OF SPEED RECORDS WITH:		NUMBER OF INDIVIDUALS	AVERAGE SPEED INDEXES		
			Girls	Men	Total
Sex	Girls	25			38
	Men	42			34
Age (years)	16–18	24	33	37	34
	19–21	31	38	37	37
	22–	12	38	34	36
Schooling (grades completed)	6–10	25	34	36	35
	10.5–11.5	10	33	33	33
	12–15	26	40	34	38
Experience in office work (years)	None	16	38	41	39
	0–1	17	32	35	33
	1–	29	39	32	38

TABLE IV

Relation of accuracy records to sex, age, schooling, and experience, for billing machine operators working less than six months (vacation workers omitted)

COMPARISON OF ACCURACY RECORDS WITH:		NUMBER OF INDIVIDUALS	AVERAGE ACCURACY INDEXES (ERROR PERCENTAGE)		
			Girls	Men	Total
Sex	Girls	25			2.4
	Men	42			3.4
Age (years)	16–18	24	2.0	2.9	2.6
	19–21	31	2.4	3.6	2.8
	22–	12	2.4	4.7	3.0
Schooling (grades completed)	6–10	25	3.6	3.7	3.6
	10.5–11.5	10	1.9	2.7	1.9
	12–15	26	2.4	3.4	2.4
Experience in office work (years)	None	16	3.0	2.2	2.4
	0–1	17	1.9	5.2	3.8
	1–	29	2.4	3.6	2.4

been presented with regard to the relationship of individual production to sex, age, schooling, and experience, it may be stated that efficiency cannot be predicted with any useful degree of precision from such items of information as these personal qualities with which we have dealt. The differences that are shown between the different sexes, ages, etc., are so small and so inconsistent in the different comparisons, the number of individuals is so small, and the original reliability of the records (especially those of errors) is so questionable, that all the indicated relations can be considered as having suggestive value only. In every case the differences within a group are far greater than the differences between that group and the one with which it is compared. In answer to the question, then, of whether we can predict the future value of billing machine operators on the basis of sex, age, schooling, etc.—items available at the time of employment—our conclusion must be in the negative.

It is, however, to be emphasized that negative conclusions in an inquiry of this sort are by no means devoid of value. It is important for employment supervisors to know what not to depend upon as well as to know what items may be utilized. In the present instance, actual employment procedure was making use of certain items (especially the requirement of high school education) which have apparently only negligible diagnostic value. It is only by learning what devices fail in employment selection as well as what ones succeed that we shall eventually be able judicially to evaluate tests, the several items of personal information, references, trial at the job, and so on. Research cannot be limited to one or two spectacular and promising methods like tests and rating scales.

2. Labor turnover in relation to sex, age, schooling, and previous experience

We come now to the second of the three major questions that were stated at the beginning of our analysis. Our present question involves such considerations as whether the turnover among men is greater than among girls, whether it is greater among older or younger persons, among employees experienced or inexperienced in office work, and among employees with more or with less schooling. Clearly the answers to such questions will determine whether we can predict at the time of employment from such items as age, sex, etc., whether the applicants are likely to leave relatively soon.

The relations that were found are shown in table V. While few of these differences are large enough to be of value as guides in the selection of employees, they do contain some hints as to the location of special difficulties in regard to turnover. Let us state a few of these relations.

As to the difference in *sex*, there is a slight tendency for the men hired to leave sooner and in greater numbers than is true of the girls. The entire difference occurs during the first month of employment, during which time 15 per cent of the girls and 23 per cent of the men leave. The differences in reasons for leaving as between the sexes are shown in table VI.

With regard to *age*, there is a slight tendency for the youngest people to

TABLE V

Duration of employment of billing machine operators in relation to sex, age, schooling, and experience

COMPARISONS OF DURATION OF EMPLOYMENT WITH:		NUMBER OF INDIVIDUALS IN EACH CLASS	PER CENT OF EACH CLASS WHO WORKED:			
			1 month or less	1 to 3 months	3 to 6 months	6 months or less
Sex	Girls	187	15	20	11	46
	Men	192	23	16	14	53
Age (years)	16–18	104	18	25	10	5
	19–21	176	19	15	12	46
	22–5	97	19	14	13	46
Schooling (grades completed)	6–10	126	23	17	9	49
	10.5–11.5	70	16	13	14	43
	12–15	133	8	22	16	46
Experience in office work (years)	None	72	7	24	8	39
	0–1	117	15	18	14	47
	1–	144	19	16	12	47

TABLE VI

Reasons for leaving in relation to sex and duration of employment among billing machine operators

REASON† FOR LEAVING	NUMBER* OF INDIVIDUALS WHO LEFT IN:							
	1 month or less		1 to 3 months		3 to 6 months		6 months or less	
	Male	Female	Male	Female	Male	Female	Male	Female
Return to school	3	1	8	13	6	4	17	18
Inefficiency	10	8	6	4	5	2	21	14
Unknown—left without notice	15	8	0	4	6	1	21	13
Another position	4	1	3	3	5	4	12	8
Dissatisfied	8	5	2	2	0	0	10	7
Lay-offs	0	0	2	3	3	2	5	5
Health	0	4	2	2	0	2	2	8
Leaving city	1	0	2	3	0	2	3	5
Salary	2	1	1	1	0	1	3	3
Miscellaneous	1	0	2	2	0	1	3	3
Absence and tardiness	1	0	2	0	1	1	4	1

* The total number of men employed in the period under consideration is almost exactly the same as the total number of girls, 192 and 187 respectively. Hence the comparisons of absolute numbers in the table also represent fairly closely the relative relations.

† The inadequacy of the list of reasons for leaving is apparent. We were not able, of course, to go beyond the records that had been accumulated.

be more unstable employees than the older. The younger employees left in larger numbers especially in the period from one month to three months after employment. Analysis of the reasons for leaving revealed the fact that this difference was due almost entirely to the larger number of young persons returning to school, but an important difference also appears in the greater number of young employees leaving because of inefficiency—14 per cent of those under 19 as against only 7 per cent of those 19 or older.

In amount of *schooling*, there is a decided tendency for persons with little schooling (two years of high school or less) to leave in greater numbers during the first month, though at the end of six months only a slightly larger percentage have left than in the case of the high school graduates. This last fact is found, however, to be due entirely to the large number of individuals with more schooling who left to return to school (see the first line in table VIII)—individuals who presumably were given summer employment and hence may properly be eliminated in our analysis of the factors associated with instability of employees. If we tabulate the information on schooling in table V, omitting the individuals leaving to return to school, we obtain table VII. There is a striking tendency manifest for the people with less schooling to be less stable employees as billers, as is clear from the total per cents leaving within six months.

The principal differences in reasons for leaving between the people with more and those with less schooling are shown in table VIII.

The table shows that people with more schooling do not leave nearly as frequently as others on account of inefficiency or without notice; they are more likely than others to leave for the purpose of returning to school or taking another position.

TABLE VII

Relation of amount of schooling to stability of employment among billing machine operators

SCHOOL GRADES COMPLETED	NUMBER OF INDIVIDUALS	PER CENTS (OMITTING THOSE RETURNING TO SCHOOL) LEAVING IN:			
		1 month or less	1 to 3 months	3 to 6 months	6 months or less
6–10	126	23	16	9	48
10.5–11.5	70	13	9	13	34
12–15	133	8	11	9	28

TABLE VIII

Relation of amount of schooling to reasons for leaving among billing machine operators

REASON FOR LEAVING	PER CENTS OF EACH GROUP LEAVING WITHIN 6 MONTHS, DUE TO THE CAUSES LISTED:		
	Grades 8 to 10	Grades 10.5 to 11.5	Grades 12 to 15
Return to school.....	2	9	18
Left without notice....	11	1	6
Inefficient.....	16	7	3
Another position.....	22	4	6

As regards *amount of previous office experience*, table V shows that the stability is noticeably greater among individuals who have had no experience. This is particularly true during the first month of employment. The relations are again made more clear if we eliminate the individuals leaving to return to school (since an unduly large proportion of these are people with no or little experience). We then get table IX.

TABLE IX

Relation of amount of previous office experience to stability of employment among billing machine operators

YEARS OF EXPERIENCE	NUMBER OF INDIVIDUALS	PER CENTS (OMITTING THOSE RETURNING TO SCHOOL) LEAVING IN:			
		1 month or less	1 to 3 months	3 to 6 months	6 months or less
None	72	7	13	6	26
0–1	117	15	10	10	35
1–	144	18	13	10	41

TABLE X

Relation of amount of previous office experience to reasons for leaving among billing machine operators

REASON FOR LEAVING	PER CENTS OF EACH GROUP LEAVING WITHIN 6 MONTHS, DUE TO THE CAUSES LISTED		
	No experience	1 year or less	Over 1 year
Return to school.....	14	12	6
Left without notice....	4	4	8
Inefficient.....	3	12	9
Another position or dissatisfied.....	4	9	9

The principal differences in reasons for leaving between the people with more and those with less experience are shown in table X. There is evidently less tendency for individuals without previous experience to leave because of inefficiency, dissatisfaction, or to leave without notice, than in the case of those with more experience. (To some extent these relations are due to the fact that the people without experience tend to be the ones with most schooling.)

Let us summarize, now, the main turnover relationships found:

Sex—Men leave in greater numbers than girls during the first month of employment, especially for the reasons, "left without notice," "another position," and "dissatisfaction."

Age—The youngest people (16 to 18 years of age) leave in slightly greater numbers than the older ones, especially for reasons, "returning to school" and "inefficiency."

Schooling—Employees with schooling not exceeding two years in high school leave in decidedly greater numbers during the first month of employment than those with more schooling, and in slightly greater numbers thereafter if we omit all individuals returning to school. Reasons "left without notice" and "inefficiency" are most prominent.

Experience—Employees who have had previous office experience leave in decidedly greater numbers during the first month than do those with no experience, and in slightly greater numbers thereafter if we again omit individuals returning to school. Reasons, "left without notice," "inefficiency," and "another position or dissatisfaction" are most prominent. (The relations are to a considerable extent the same as those under schooling since many of the individuals with experience are ones with less schooling.)

3. Production and turnover in relation to individual records during the earlier months of employment

We come to consider now the final one of the three questions proposed in our introductory remarks. The question which is to be answered in this section is: How well can we predict the future value (in terms both of stability and production) of billers on the basis of their production records during the early months of employ-

ment? We shall deal with this topic under several heads.

(a) *General relations of the records of later months to those of earlier months.* All individuals begin at a rather low standard of efficiency and improve over a number of months, typically progressing more rapidly at first and more slowly later. We have found that *on the average* very little improvement occurs in either speed or accuracy after the first six months. While this is the average tendency there are, of course, a great many individuals who improve far more rapidly or far more slowly than the average. It is certain that not all individuals who do well in comparison with their fellows during the first month or the second month will be relatively as high at the end of six months. If all individuals improved uniformly, if the highest in the first month continued highest and the lowest continued lowest, we could predict after one month which individuals would be satisfactory and which would not. But since individuals do not progress at equal rates, the problem is to know how good an estimate can be formed from records of the first few months as to the individual's ability after he has reached his permanent level. We wish also to tell from the records of early months which individuals are most likely to be unstable employees.

Table XI shows the average rate of improvement in speed and accuracy of billers:

It is to be noted that the workers leaving after one month or two months have poorer average records for those first two months than do those remaining longer. This was found to be due to the fact that individuals with poor records in the first and second months are slightly more likely to leave in less than six months than are those with better records.

TABLE XI

Average rate of improvement in speed and accuracy of billing machine operators

Month	Speed—average accounts per hour				Accuracy—average per cent of errors			
	Groups according to length of employment:				Groups according to length of employment:			
	6 months or more	3 to 5 months	2 months	1 month	6 months or more	3 to 5 months	2 months	1 month
1st	22.5	22.7	21.3	20.1	6.68	6.88	7.18	7.71
2nd	28.4	29.6	25.7		3.70	4.18	5.18	
3rd	33.0	33.7			3.10	3.15		
4th	36.4	*			2.89	*		
5th	40.6	*			2.69	*		
6th	40.8				2.67			
7th	40.8				2.86			
8th	44.1				2.32			
9th	42.8				2.45			

* Number of individuals too small to give reliable averages.

(b) *Relative standing of individuals in speed and accuracy in different months.* Let us rank individuals according to their speed and separately according to their accuracy for the first month, giving the best record first place, the next best second place, and so on. Then do the same for the second month, third month, etc. Now we can compare the order of individuals for the different months to see whether people high one month continue high in other months, in such a way that we would be able to predict in advance how well they will do. (We made similar comparisons by charting in detail the actual records of different months in comparison with one another. These graphs bear out the conclusions stated below.)

In general, we find that the predictions that can be made are highly inaccurate. Take, for example, our ability to predict what the records of individual typists will be in the sixth month, on the basis of records for the earlier months. We find that the first month's records give practically no indication at all, for either accuracy or speed. The second month's records show a trifle closer relation; the third month is just a bit better; the fourth and fifth are naturally still closer. But even in predicting sixth month standing from fifth month standing, our error would be about two-thirds as great as by mere guess (correlation coefficient 0.76). The results are given in table XII. The same sorts of relations are found when we take months other than the sixth for comparison. On the whole, standing in speed shows somewhat closer agreement from month to month than does standing in accuracy. Speed and accuracy records do not show close agreement with each other (table XIII).

TABLE XII

Correlation coefficients showing relations of individuals' standing in different months

CORRELATION OF 6TH MONTH SPEED RECORD WITH:	CORREL. COEF.	N	CORRELATION OF 6TH MONTH ACCURACY RECORD WITH	CORREL. COEF.	N
1st month speed	0.20	57	1st month accuracy	0.00	49
2nd month speed	0.48	55	2nd month accuracy	0.25	50
3rd month speed	0.60	57	3rd month accuracy	0.31	52
4th month speed	0.76	57	4th month accuracy	0.58	55
5th month speed	0.76	57	5th month accuracy	0.74	56
7th month speed	0.86	44	7th month accuracy	0.72	44
8th month speed	0.74	32	8th month accuracy	0.40	32
9th month speed	0.68	21	9th month accuracy	0.16	21
2nd month accuracy	−0.10	50	2nd month speed	0.25	55

TABLE XIII

Correlation coefficients showing relation of speed and accuracy in different months

	CORREL. COEF.	N
1st month	0.35	49
2nd month	0.37	50
3rd month	0.37	52
4th month	0.51	55
5th month	0.48	56
6th month	0.34	57
7th month	0.52	44
8th month	0.29	32
9th month	0.53	21

The correlation coefficients are shown in tables XII and XIII.

In conclusion, we again arrive at the statement that *some* relationship is shown in the direction in which we wish to predict, but again the relationship is not sufficiently close to make possible reliable individual prognostica-

tions, except perhaps among individuals especially low in their records during early months.

(c) *Predictions of turnover and individual production on the basis of production records of the first two months.* In order to arrive at some general conclusion as to how much the speed and accuracy records of the first two months could be made to reveal about individuals' future value, we arbitrarily divided all the people considered into "successes" and "failures."

"Failures" consisted of:

(1) Individuals who left in less than 6 months. (Individuals leaving to return to school were omitted as being in a special class.)

(2) Individuals who in the sixth month had not attained a speed of more than 35 accounts per hour.

(3) Individuals who in the sixth month had not attained an error record of less than 4 per cent.

"Successes" included all others.

The question now is: How well will the first and second month speed and accuracy records show which individuals will be "failures" and which ones "successes?"

The most significant comparisons may be summarized as in table XIV. It is clear from this table that, on the average, predictions of considerable value can be made concerning individuals who are especially low in the records for the first and second months, even though the judgment concerning any one person is subject to great error.

4. Summary

The three main questions raised at the beginning of our discussion have now been considered in the light of the data available. Hard and fast conclusions are not possible, partly because the data are inadequate, partly because a complete statistical analysis of all the variable items involved would become hopelessly complex, if not actually impossible, and partly because many practical considerations enter into any final decisions—considerations not at all present in our analysis.

With these limitations in mind, we may, nevertheless, summarize the findings which our present material does justify.

1. Can we predict the future efficiency of billers on the basis of information as to sex, age, schooling, and previous experience, obtained at the time of employment?

In general, the answer is no. Slight advantages of different groups according to sex, age, schooling, and experience, were found, but in all instances these differences were so small and equivocal as to be of little significance in an attempt to estimate the future value of individual typists.

2. Can we predict the probability of individuals' leaving within a relatively short time, on the basis of information as to sex, age, schooling, and experience?

A number of significant relationships were found between sex, age, etc., and turnover. It is questionable, however, whether these relations are of such a nature that they would be useful to the employment office in predicting which applicants are most likely to become permanent employees. In connection with many other items, they would probably prove helpful.

3. Can we predict the future value of billers on the basis of their production records during the first few months?

Although the general answer to this question must be mainly in the negative, if we limit the question to predictions with respect to especially poor workers (and from a practical point of view these would be of primary interest), the answer is that predictions of some value are possible. For example, we can predict that the chances are less than one in ten that an individual will be a "success" who in his second month has a speed of less than 20 accounts per hour and errors of 6 per cent or more.

ANALYSIS OF DATA—1921 GROUP OF BILLING MACHINE OPERATORS

In this second division of our study, we shall deal primarily with the question: How well can we predict the ability of billing machine operators (in this case the 1921 group) on the basis of certain personal characteristics and scores on psychological tests? The question has already been discussed in part for the 1920 group of workers. Secondarily, in the present connection, we shall treat of the esti-

TABLE XIV

Predictions from first month records

Speed—No predictions of appreciable value can be made.

Accuracy—Of the individuals who made less than 4 per cent errors in the first month, 12 out of 35 (*34 per cent*) are "Successes." Of the individuals who made more than 4 per cent errors in the first month, 14 out of 80 (*17 per cent*) are "Successes."

Of the individuals who made less than 10 per cent errors in the first month, 23 out of 86 (*27 per cent*) are "Successes." Of the individuals who made more than 10 per cent errors in the first month, 3 out of 29 (*10 per cent*) are "Successes."

Speed and Accuracy combined—Of the individuals who made less than 4 per cent errors in the first month and also had a speed of 15 accounts per hour or better, 12 out of 31 (*39 per cent*) are "Successes." Of all other individuals, 14 of 84 (*17 per cent*) are "Successes."

Predictions from second month records

Speed—Of the individuals who were below 20 accounts per hour in the first month, 1 of 9 (*11 per cent*) are "Successes." Of the individuals who were above 20 accounts per hour in the first month, 25 of 78 (*32 per cent*) are "Successes."

Of the individuals who were below 30 accounts per hour in the first month, 11 of 57 (*19 per cent*) are "Successes." Of the individuals who were above 30 accounts per hour in the first month, 15 of 30 (*50 per cent*) are "Successes."

Accuracy—Of the individuals who made less than 6 per cent errors in the second month, 24 of 67 (*36 per cent*) are "Successes." Of the individuals who made more than 6 per cent errors in the second month, 2 of 20 (*10 per cent*) are "Successes."

Speed and Accuracy combined—Of the individuals who made less than 6 per cent errors in the second month and also had a speed of 20 accounts per hour or better, 24 of 63 (*38 per cent*) are "Successes."

Of all other individuals, 2 of 24 (*8 per cent*) are "Successes."

mated ratings of the typists' abilities as these abilities are estimated by supervisors, and shall say something of the use of these ratings. In general we desire an indication as to the value of psychological tests and rating estimates as aids in selecting and judging billing machine operators.

The group considered here is very small—32 in number. Complete records (ones extending back at least six months) were obtained for only 25 persons, and for several of these the psychological test scores are lacking. All findings must consequently be accepted with reservations due to the few individuals involved.

As was earlier mentioned, the system of machine billing underwent a considerable modification between 1920 and 1921. The most important change consisted in the simplification of the billing operations by eliminating the principal mental calculations previously required. At the same time slight changes were made in the methods of measuring speed and errors for purposes of figuring bonuses. The data in this part of our inquiry are consequently not directly comparable with those gathered in the earlier study.

We shall make three main comparisons: (1) The relation of individual efficiency to sex, age, and schooling; (2) The relation of individual efficiency to scores on psychological tests; (3) The relation of individual efficiency to the ratings of several characteristics by supervisors.

1. The relation of individual efficiency to sex, age, and schooling

Individual efficiency indexes were calculated by taking the average monthly record for each individual for the six months ending in July, 1921. The speed index is in number of recap sheets[2] done per month; the accuracy index is given in two forms, as (a) the average number of errors per month and (b) the number of errors per month relative to the number of recaps done—obtained by dividing the number of errors by the number of recaps. In addition to these three indexes based on production records, we have ratings by three supervisors of the typists' speed, accuracy, and general value. These ratings were made by simply arranging the 32 typists in order from highest (given the rank 1) to lowest (given the rank 32), first with respect to speed, then with respect to accuracy, and finally with respect to general value. The ranks thus given an individual by the three supervisors were averaged to obtain an index for that individual. We have, then, six different criteria of individual efficiency with which to compare the sex, age, and schooling of the billing machine operators. These comparisons are shown in table XV. The principal indications of the table may be summarized in a few words:

Sex—The men are decidedly faster than the girls; they also make fewer errors per recap, though their total number of errors is greater due to the greater amount of work done. The men are also rated higher in speed and in general value, and in accuracy there

[2] A "recap" sheet is a proof sheet upon which carbon copies are made of the bills as they are typed. It carries spaces for postings of forty-four bills. The number of recaps completed per month accordingly gives a measure of speed of the same kind as does number accounts billed per hour, though in entirely different terms.

is practically no difference. The superiority of the men in speed agrees with the findings in the 1920 group, though there the girls were superior in accuracy.

Age—No difference appears between the younger and older workers in speed. The number of errors per recap and also the ratings by supervisors show superiority of the younger group in accuracy. The younger individuals are also, on the average, rated as of greater value to the company. The 1920 group showed some differences in speed that do not appear here; in accuracy the tendency was the same as here though very slight.

Schooling—Amount of schooling shows no clear relation to speed. Accuracy, however, is much greater among high school graduates. High school graduates are also rated as being very decidedly superior as regards their value to the company. The 1920 group likewise showed no differences in speed, but accuracy was higher among those with *less* schooling.

Differences between the 1920 and the 1921 groups may be due either to the changed methods of work, to differences in the constitution of the groups, or to other influences and combinations of those mentioned. Insofar as we can rely upon conclusions from the small numbers of persons dealt with here, the indications are in favor of employing men, individuals under 20 years of age, and high school graduates.

TABLE XV*

Relation of speed and accuracy records to sex, age, and schooling, for billing machine operators (1921 group)

COMPARISON OF PRODUCTION RECORDS WITH:		AVERAGE SPEED INDEX	AVERAGE ACCURACY INDEX (ERRORS)	AVERAGE ERRORS PER RECAP	AVERAGE RATINGS		
					Speed	Accuracy	General value
Sex	Girls	141	98	74	21	16	18
	Men	149	113	70	14	17	13
Age (years)	16–19	146	99	67	16	14	13
	20–	148	102	74	15	18	19
Schooling (grades completed)	6–11	148	99	70	18	20	20
	12–15	147	95	61	15	8	9

* Attention should be called to the fact that in all columns of the table save the first, low numbers mean high ability.

2. *The relation of individual efficiency to scores on psychological tests*

The same six criteria of efficiency are used here as in the preceding section. We shall not attempt to describe the tests that were given beyond saying that one was a general intelligence or mental alertness test (the Army test) and the others included standard tests for attention, eye-hand coördination, accuracy, etc. The test-

ing required about one hour of each individual's time.

After we have our test scores and also some other measure of efficiency, the next step is to compare these to see how well they agree. We wish to know whether those individuals who score high in the tests stand high in efficiency of production, and whether those low in the tests stand low in efficiency. The correlation was found for each of the test scores and years of schooling with each of the six measures of efficiency that have been described.

The correlation coefficients are given in table XVI. The number of individuals ranged from 17 to 27 for the coefficients in this table.

None of the tests show any close relationship to *speed* of work, whether we measure speed by production records or by supervisor's ratings. The general intelligence test shows some slight agreement with the ratings of speed as does also the number of years of schooling. While predictions of the future speed of work would be highly unreliable if based upon the intelligence test score and years of schooling, still it is interesting to note that they would be more sound and reliable than if based upon the actual records of speed and accuracy obtained during the first month (if we may assume the same general relation to be true in the 1921 group as we found in the 1920 group.)

As regards predictions of *accuracy*, much closer relations are found. Four different tests show fairly good agreement with the errors per recap. In fact, these tests prove to be as valuable in predicting the accuracy of workers as were the fourth and fifth month records of accuracy in predicting later months, in the case of the 1920 billing machine operators. Amount of schooling was also found to be related to accuracy, especially accuracy as rated by the supervisors. We have, in these results, an indication that simple tests requiring a few minutes (the two best ones in this connection take, all told, less than 10 minutes), and a record of the amount of schooling, give more information about the typists' later accuracy at work than do the records based upon several months of employment.

Several of the tests and also the

TABLE XVI

Correlation coefficients showing the relation of test scores to supervisors' ratings and to efficiency records

	SPEED INDEX	ACCURACY INDEX	PER CENT ACCURACY INDEX	SPEED RATING	ACCURACY RATING	VALUE RATING
Army Alpha	−0.10	0.32	0.52	0.34	0.39	0.48
Cancelling a's	0.12	0.45	0.66	0.19	0.26	0.37
Cancelling q r s t	0.22	0.02	0.32	0.16	0.10	0.21
Cancelling Digits	−0.05	0.24	0.39	0.13	0.16	0.20
Substitution	−0.04	−0.04	0.46	0.08	0.18	0.30
Knox Cube	−0.16	0.55	0.48	0.09	0.42	0.45
Card Sorting	−0.11	0.33	0.31	0.05	0.16	0.39
Years schooling	0.23	0.31	0.39	0.36	0.63	0.55

number of years of schooling, appear to be fairly good indicators of the *general value* of billing machine operators as that value is estimated by supervisors. It is significant that intelligence measures and amount of schooling should show this rather high correlation with ratings of general value. The multiple correlation between the value ratings and a combination of Alpha test score and schooling is 0.65. This at least suggests that in employing individuals with the possibility of promotion in mind, the use of intelligence tests and attention to amount of previous schooling may be especially valuable.

In general, there appears to be sufficient evidence from our test results to warrant the use of such tests in a more thorough try-out under actual employment conditions. The indications are that the tests can be used as aids both in predicting which billers will be efficient (as regards accuracy) and in showing intellectual qualities that are important in the future general value of the individuals. The tests are far from giving perfect predictions or, used alone, of enabling the employment office to decide upon the acceptance or rejection of applicants. They are promising simply as aids to the interviewer in his "all around size-up" of the applicant.

To test the tests adequately, they should be given to all new applicants over a period of months. Then the test scores could be compared with follow-up reports and records of the new employees, to see whether the low score individuals were less capable and less stable than those with higher scores. It is important to note that our data show years of schooling to be as good a diagnostic sign as are any of the tests. Research is needed quite as much on items of this sort as upon test results.

3. The relation of individual efficiency in production to the ratings of several characteristics by supervisors

As has been stated, three supervisors rated each of the billing machine operators for speed of work, accuracy of work, and general value to the company. The supervisors also gave estimates of each typist on eleven different characteristics or traits of personality. These sets of ratings are now to be compared among themselves and with production records.

First, as to the general ratings of speed, accuracy, and general value. The ratings by the three supervisors agreed very closely with one another even though they were submitted quite independently. The correlations between the ratings by each supervisor and those by each of the other supervisors all fell between 0.70 and 0.90. The average ratings by the three supervisors agreed rather well with production records, but appear to be by no means a mere duplication of these records. The correlations among the average ratings and between the ratings and efficiency records are shown in table XVII. The number of individuals ranged from 23 to 31 for the coefficients in this table. The estimates of speed show very high correlation with records of speed while the accuracy ratings give somewhat lower correlation with records of accuracy. (This and other facts lead to the belief that the accuracy records are subject to considerable error due to the method in use for checking errors.) The ratings of gen-

eral value are in extremely close agreement with ratings of accuracy and show only fairly good agreement with ratings of speed, indicating that in the minds of the supervisors, accuracy is more important than speed as an index of the general value of the typists. The general value rating also correlates fairly well with actual records of both speed and accuracy.

Next to be considered are the supervisors' ratings of the specific characteristics of the typists. Thirty-two typists were estimated with respect to eleven qualities by three supervisors. In each quality the individual was rated by a letter grade, as follows:

A, decidedly above average
B, slightly above average
C, average
D, slightly below average
E, decidedly below average.

The eleven characteristics used were:

Punctuality
Industry
Coöperativeness
Cheerfulness
Intelligence
Nervousness
Popularity
Energy
Talkativeness
Seriousness
Self-confidence

The meaning of each characteristic was indicated by a few descriptive adjectives, for example:

Coöperativeness: Willingness to "pull together."

Nervousness: Is the person "high strung," fussy, etc.?

Energy: Is the person active, "full of pep," etc.?

Two of the qualities—nervousness and talkativeness—were dropped from our results because they showed almost no agreement as estimated by different

TABLE XVII

Correlation coefficients showing the relation of supervisors' ratings to efficiency records and to one another

	SPEED INDEX	ACCURACY INDEX	PER CENT ACCURACY INDEX	SPEED RATING	ACCURACY RATING
Speed rating.....	0.88	0.16	0.41		
Accuracy rating....	0.41	0.43	0.56	0.56	
Value rating.....	0.58	0.28	0.61	0.62	0.89

supervisors. The nine remaining qualities have been compared with the standing of the typists (1) in general value (as rated), (2) in speed of work (by actual records), and (3) in accuracy of work as indicated by errors per recap sheet.

The comparisons in (1) should show what specific characteristics, in the opinions of the supervisors, are especially closely related to *general value* and hence are characteristics to be sought in selecting and training the billing machine operators. *Intelligence, Self-Confidence, Energy,* and *Seriousness,* stand out as the characteristics most closely linked, according to supervisors' estimates, with the general value of the typists to the company. Persistence and punctuality come next; then coöperation and popularity; and finally cheerfulness, in which last case there is comparatively little relation to the value ratings.

The second set of comparisons (speed of work and the nine character traits rated) aims to bring out any significant relations between specific characteristics of the typists and their actual *speed of production.* All the relations are much less close than were those discussed in the preceding paragraph. Only the ratings of *Self-Confidence* show a high measure of agreement with speed records. Some slight posi-

tive relation is found between speed and the traits Energy, Intelligence, and Coöperativeness. Almost no agreement occurs in the case of Seriousness, Popularity, Punctuality, and Persistence. Cheerfulness shows a slight negative relation to the speed records, that is, the faster typists tend to be rated as less cheerful.

The third group of comparisons is made in the same manner as the second but using records of *relative accuracy* instead of speed. None of the relationships are close. *Intelligence* and *Self-Confidence* agree fairly well with accuracy records. A slight agreement is present for Popularity, Energy, Seriousness; and almost no agreement for Punctuality, Persistence, Coöperativeness, and Cheerfulness.

From the foregoing comparisons it appears to be fairly clear that *Intelligence* and *Self-Confidence* are the two qualities of those rated which hold an especially close relation not only to supervisors' rankings of general value but also to objectively measured speed and accuracy of work.

4. Summary

Conclusions based upon our study of the 1921 group of typists must be viewed as decidedly tentative, due to the small number of individuals, the unreliability of part of our data, and the incompleteness of the factors considered. Our analysis, however, has pointed in the following directions:

1. Men appear somewhat superior to girls in speed and accuracy of work and in their general value to the company as estimated by supervisors. Likewise, younger typists, on the average, are superior in accuracy of work and in general value. The same is true in more marked degree of high school graduates.

2. Several mental tests were found that showed promising results as devices to help predict the relative accuracy of billing machine operators and their general value to the company. Number of years of schooling was also shown to be valuable in the same way. Intelligence test scores and amount of schooling are in especially close agreement with ratings of the individuals' general value. More complete and extended try-out of the tests is needed to demonstrate clearly just what value they have in selecting billing machine operators.

3. Relative accuracy appears to be considerably more important in the supervisors' opinion of the general value of typists than is speed. Intelligence and Self-Confidence stand out as characteristics which the supervisors' ratings place in especially close agreement with the typists' speed and accuracy of work and their general value to the company. Energy and Seriousness also appear to be closely related to estimates of general value.

GENERAL CONCLUSIONS

We have already summarized separately the findings of our analyses of the two groups of billers. A few general conclusions and comments may now be set down.

1. The examination of the 1920 group brought out the fact that such considerations as sex, age, schooling, and previous experience, while they show interesting relations to success on the job, are inadequate as criteria to be used in any direct and simple

way in selection. In the 1921 group, information of the same sort proved to give rather better indications of the later value and efficiency of work of typists. Especially marked is the superiority of high school graduates, on the average, over typists with less schooling. No rigid standards of selection and rejection, however, appear to be justified in the light of our results. But we can definitely recommend that the significant relations found should be made known to interviewers selecting persons for this work. Further studies along similar lines should be made which will gradually establish and put at the disposal of the interviewers, valuable information concerning qualities that are characteristic of successful billers.

2. Several mental tests were found that showed sufficiently good results to warrant their more extended use (at first in an experimental way) as possible aids in the selection of billing machine operators. The tests gave better results, on the whole, than any other of the facts considered save years of schooling; and the tests supplement in a useful way this item of schooling.

3. A beginning was made at determining some of the character traits especially important for the billing machine operator to possess. Analysis of this kind should also be of value to interviewers in telling them a little more definitely what characteristics to look for in applicants. The present study indicated Intelligence and Self-Confidence as the two most important qualities.

4. Production records of the first and second months can be used with advantage in predicting which individuals are going to fail as billers, and who accordingly might well be transferred to other work without long and expensive delay. The sort of results found in this connection for the 1920 group of workers should be ascertained for workers under the present system. If the findings are similar to those we obtained, they should prove of value in making transfers, lay-offs, and discharges. Studies in the typical rate of improvement may also be useful as standards and incentives for individuals in training.

News Notes

MEETING OF TAYLOR SOCIETY

The Spring meeting of the Taylor Society was held at Syracuse, New York, June 7 to 9, 1923. Perhaps the good attendance at this joint meeting of the National Society with the Central New York and Southern New York Sections may be attributed to the fact that many executives and foremen realize that it is time to restore that vigorous attitude toward management which was lost in part during the depression. On the other hand, we must not overlook the fact that Syracuse is the focal point of a number of fine automobile trunk lines, and driving in June is certainly not unpleasant.

On Thursday afternoon Wilford I. King of the Bureau of Economic Research, New York, read a paper which summed up the salient features of the final report made by the committee of the President's Conference on Unemployment.

On Thursday evening a paper on sales organizations was presented by Harry R. Wellman, Professor of Marketing at the Amos Tuck School. There may be expected more intense competition in business in the future and it was about the responsibility of sales organizations to meet this competition that Mr. Wellman spoke.

The delegates spent the whole day on Friday as guests of the Corona Typewriter Company. An inspection of the plant added interest to that already shown by the readers of recent articles on progressive methods of management as published in the "Bulletin of the Taylor Society."

Keppele Hall, Supervisor of Planning, The Joseph and Feiss Company, Cleveland, read a paper on the subject of the planning department as an instrument of executive control.

The courtesy of the H. H. Franklin Company permitted the delegates to observe on Saturday some interesting mechanisms of a most progressive management.

AMERICAN MANAGEMENT ASSOCIATION ACTIVITIES

Convention for 1923

Recent issues of the Association's "News Letter" announce that the Convention for 1923 will be held in New York on October 29, 30, and 31, at the Hotel Astor.

Owen D. Young, Chairman of the Board of the General Electric Company, has accepted the Chairmanship of the General Convention Committee, and Harry Hopf has been appointed Chairman of the General Convention Program Committee.

"The plan of the convention provides for three parallel sessions on Monday, October 29th, both morning and afternoon; on Tuesday, October 30th, for two parallel sessions in the morning, and one general session in the afternoon, including the business meeting at 4:30, and a dinner devoted to Coöperation with Collegiate Schools of Business and Engineering Colleges, at 6:30; on Wednesday, October 31st, parallel sessions for each of the Plant Executives, Sales Executives and Office Executives Divisions, running from 10:00 a.m. to 12:30 p.m. and from 2:30 p.m. to 5:00 p.m."

American Management Review

No items of Association News are to be published in the "American Management Review" they will appear in the "News Letter," thus giving over more space to publication matter of a different nature.

The personnel of the Editorial and Publications Committee is as follows:

Chairman, Henry C. Link, United States Rubber Company

L. P. Alford, Management and Administration, The Ronald Press Company

Paul F. Brissenden, School of Business, Columbia University

L. L. Park, American Locomotive Company

J. W. Dietz, Western Electric Company
Joseph H. Willits, University of Pennsylvania
Rita Hilborn, H. A. Hopf and Company

Biographical Service

The Association announces, or rather brings to the attention of its members their bibliographical service. Unlimited service in the form of bibliographies compiled from books, pamphlets, periodicals, reports, magazine articles, or any published literature on management problems is offered to Research, Sustaining, and Company members. Individual members are entitled to twelve bibliographies per year, to be confined to the subject matter of the division with which the individual member is associated. The organization of the Association offices makes possible the maintenance of contacts with other agencies, thus allowing complete service.

The Management Index

The "News Letter" calls to the attention of its readers the feature of the "American Management Review" in a classified index of management literature, based on the proposed classification as recommended to the Dewey Decimal System by the Joint Committee on Management Terminology.

INDUSTRIAL HYGIENE RESEARCH BY LABOR

From "Health Facts," a 30 page bulletin prepared by the Workers' Health Bureau, it is learned that Organized Labor is conducting research experiments in Industrial Hygiene. "Health Facts" is issued by the New York District Council No. 9, Brotherhood of Painters, Decorators, and Paperhangers of America, and describes the dangers of the trade and their effect on the lives of workers in this trade. The bulletin includes in addition to the results of experiments conducted in the Journeymen Painters and Allied Crafts Health Department, well-arranged facts resulting from many previous surveys, covering such subjects as accident rates and death rates in the trade, sickness costs, and symptoms and results of poisoning from lead, turpentine, naphtha, wood alcohol, aniline, benzine, amylacetate, banana oil, and benzol.

The Journeymen Painters and Allied Crafts Health Department is probably the first *trade union* institution to be established for the study of the causes and the prevention of occupational diseases. The department was opened in July, 1922, with a staff of medical director, dentist, nurse, roentgenologist, and laboratory technician. Dr. Alice Hamilton, Professor of Industrial Hygiene at Harvard University, and Dr. Emery R. Hayhurst, Professor of Industrial Hygiene at Ohio State University coöperate with the Journeymen Painters and Allied Crafts Health Department through their membership on the Advisory Committee of the Workers' Health Bureau.

The conclusions drawn from the results of investigations reported by "Health Facts" are given as follows:

"By providing regular physical examinations for members, the Brotherhood of Painters, Decorators and Paperhangers have adopted an effective *Preventive* measure. The object is to detect the first sign of disease in order to *prevent* the continuous and appalling sacrifice of workers' bodies. Careful instruction on the importance of hygienic precautions is also included as a vital part of the Health program. Such instruction cannot be carried out during working hours unless painters have proper toilet facilities, plenty of drinking water and a chance to wash up before eating. These are merely the minimum sanitary safeguards, but they are necessary as *Preventive* measures against lead and other poisons.

"In the final analysis, the fact remains that human beings cannot work in an atmosphere charged with poisonous dusts and fumes without paying the price in sickness, disability and premature death. The responsibility for continuing dangerous working conditions rests with the employers. Experimentation with cheap paints for the mere sake of economy at the expense of the health and life of workers must cease.

"In the meantime, it is imperative that painters reduce their hours of exposure to trade dangers by limiting the working week to a maximum of forty hours."

ADDRESS TO BABSON GRADUATES

Mr. Frank B. Gilbreth, in delivering an address to the graduating class at Babson Institute on June 18, 1923, selected for his subject "The One Best Way for Executives." He emphasized the point that it is the duty of those men who have received the exceptional benefits to be derived from a course such as the Institute offers to spread the knowledge of the methods acquired where- and whenever possible. That there is ample opportunity for this dissemination of the knowledge of scientific methods we may find in examining the conditions today, where many of the methods and practices that are popular in industry are ridiculous and obsolete. There are few people who "realize the astounding economic waste resulting from not having a national and international effort to find and reward the person who can demonstrate The One Best Way to Do Work in each and all of the components that go to make this One Best Way in trades and office work,—in fact, in every kind of repetitive endeavor. Thus there is failure to get *the best extent* for use as a base line from which to adapt and improve for the differing individuals and ever differing surrounding conditions, and failure to disseminate the great idea of each studying his own work to eliminate unnecessary wastes of time, effort and fatigue."

There is much written today about the monotony that accompanies work based on standardized conditions, "which, as a matter of fact, affects only a worker who is capable of handling a grade of work above the type at which he is working." Emphasis should be placed on the subject of having every worker occupy the highest position that he is fitted for.

Efficiency and ability are seldom properly evaluated to allow for careful planning of the progress and promotion of an individual. The general practice calls for a guess rather than a measurement, and this may be overcome by the application of scientific methods, many of which have already been developed,—and in fact this obsolete practice *will* be greatly overcome in the present generation, for the trend is decidedly started in this direction.

Mr. Gilbreth's address was concluded with the following remarks on the great need for leadership in this work which will be necessary before business and industry can attain the state where The One Best Way will be considered the only acceptable way.

"The great opportunity that you have enjoyed here has not been given for your benefit alone. You have now a religious duty as expressed by the greatest law for conduct and also, happily, the greatest law for management, namely The Golden Rule, and the greatest joy in the long run will come to you in the joy of achievement in service to your fellow man. You must use these opportunities to standardize human service."

"You have had the best opportunities, far, far beyond the average. The "average methods" have never led to maximum progress. The "average man" has never led civilization anywhere. You can lead because your opinions will be respected,—they will be based upon cold blooded measurement."

"All problems relating to the methods for altering the conditions cited here have already been solved. The results can be seen in successful daily use. It is expected that you will be satisfied with nothing less than the dissemination and application of The One Best Way for Executives derived from measured facts."

SURVEY OF VACATION POLICIES

The American Management Association announces the completion of a survey of vacation plans for office workers, conducted under the direction of one of the Association Committees, consisting of H. W. Casler, Assistant to Vice President, New York Telephone Company, W. F. Dobbins, Fourth Vice President of the Metropolitan Life Insurance Company, J. D. Hacket,

Consulting Engineer, Henry Miller, Employment Manager of the Guaranty Trust Company, H. L. Rhodes of the Metropolitan Life Insurance Company and Ben Schauffler, Employment Manager of the United States Rubber Company.

The report shows that the general policy is to grant two full weeks with pay to office employees who have been in the service of the company for a year, and one week with pay where the service has been less than a year. Some companies grant one day of vacation for each month of service, where this service has amounted to less than a year. Several interesting new trends are noticed in the results of the survey, which show that one-fourth of the 225 concerns questioned permit vacations to be taken at any time in the year; that the great majority of firms now name periods of from six to ten months for vacations; and that some of the companies included in the study have established vacation travel bureaus and company savings plans.

"Summed up the survey indicates that vacations with pay improve production, increase employee morale, make possible the training of employees for jobs higher up, disabuse an employee of any idea he may have as to his indispensibility to the business and permit checking up on the personnel of an organization to determine its character and ability."

ENGINEERING EXTENSION CONVENTION AND INDUSTRIAL CONFERENCE

The Eighth Annual Engineering Extension Convention and the Fourth Annual Industrial Conference were held at Pennsylvania State College on May 24, 25, and 26.

Representatives of over one hundred industrial plants attended the Convention and the Conference for consideration of problems relating to industrial training and technical education. Many of the delegates were able to take part in the meetings of both conferences.

Engineering Extension Convention

The Convention was opened Thursday by C. S. Coler of the Westinghouse Electric and Manufacturing Company, who developed the general theme of the Convention in his talk on "Scope and Limitation of Class Instruction." Other delegates talked on Classes in Foreman Training and Training for Rank and File Employees. W. T. Elder of the Engineering Extension Department read a paper on "Home Study Methods within the Shop," giving some interesting data on this activity, which is a combination of the class and correspondence plan.

On Thursday afternoon the session covered Evening Classes made possible through State and National Aid, Y. M. C. A's., and College Extension Schools. It was reported that the trend in the two schools under the direct supervision of Pennsylvania State College, at Wilkes-Barre and Allentown, is toward definite long time courses approximating college work, and arranged in units to make possible their immediate application in daily work.

A joint session was made of the banquet held in McAllister Hall on Friday evening, which was attended by all delegates of the Conference and the Convention. Dean Sackett presided. President Thomas welcomed the delegates and in his talk referred to the interdependence of Industry and College.

"Industrial Research" was discussed by Professor A. J. Wood, Head of the Department of Mechanical Engineering.

Professor N. C. Miller presented "A Definition of Engineering Extension," showing the broadened scope of the activities of late, in contrast to strictly technical and trade training. Pennsylvania State College has taken the position that there should be included a variety of business training projects, industrial economics, and even some subjects which might be deemed purely cultural.

Royal J. Meeker, of the Department of Labor and Industry, spoke on the relations of his department to technical education.

Industrial Conference

B. F. Fisher, Jr., Vice-Director of the research laboratory of the General Electric Company, at Schenectady, discussed the

problem of the supply of research men for industry. He stated that there had been such a large growth in industrial research that our colleges cannot supply men to meet this demand. There are now ten thousand men engaged in research work in thirteen hundred industrial laboratories in this country. Mr. Fisher stated that industries should insist upon the proper support of colleges to meet the demand for trained men especially the land grant colleges.

In discussing the future demand for technically trained men, F. J. Chesterman, Chief Engineer of the Bell Telephone Company of Pennsylvania, pointed to the fact that since the colleges will undoubtedly be unable to supply future demands, it is necessary that the industries look to their more brilliant non-college men for the supply of potential executives. He stated that experience has proved the wisest policy to be that of shifting men about after they are developed in order that too great specialization may be avoided in men to be used in executive positions.

The Conference was opened Friday afternoon with a talk by R. L. Sackett, Dean of the Engineering School, on Coöperative Technical Education. Discussion was opened by W. E. Wickenden, American Telephone and Telegraph Company, and was continued by C. S. Cóler, Westinghouse Electric and Manufacturing Company, E. D. Walker, Head of the Department of Civil Engineering, and L. Spaulding, Assistant Valuation Engineer, B. and L. E. Railroad.

On Saturday morning the delegates were divided into two groups according to their interest in industrial research or in organized summer employment for college students. The program follows:

Organized Summer Employment For Undergraduates, by G. H. Pfeif, General Electric Company.

Discussion by R. G. Manning, Engineer, American Bridge Company, and C. L. Kinsloe, Head, Dept. of Electrical Engineering.

What Will Be The Demand For Trained Technical Men During The Next Decade? How Shall It Be Supplied? by F. J. Chesterman, Chief Engineer, Bell Telephone Co. of Pa.

Discussion.

How And To What Extent Can The Industries And The Engineering Experiment Station Coöperate in Research?

Discussion opened by Fred G. Hechler, Engineering Experiment Station.

At noon the delegates had luncheon at the University Club, after which there were given a few closing five-minute statements of progress.

RADIANT ENERGY

A notable forum on "Radiant Energy" was held by the American Society of Safety Engineers in New York City in April. In a discussion of "The Physiological Effects of Radiant Energy," Dr. Charles Sheard of Southbridge, Mass., said that glare was one of the most prevalent evils in modern artificial lighting. "Modern illumination cannot be criticized," he said, "because of its excessive ultra violet radiation, for little or none of it ever reaches the eye; but it may often be criticized because of its excesses or deficits, by reason of distribution, in our homes, offices, and factories."

Book Reviews

ANALYSIS OF THE HOUSE CARPENTER'S TRADE

By Leslie G. Stier, Division of Vocational Education of the University of California and of the State Board of Education. Trade and Industrial Series No. 1; Division Bulletin No. 12. Berkeley California, March, 1923

REVIEWED BY RICHARD S. UHRBROCK

This study was undertaken for the purpose of securing adequate instructional material for the training of carpenters. Specific skills required for success in the work, and valuable related information were carefully listed. Definite objectives to be attained through a course in house carpentry were agreed upon through consultation with vocational educators and members of the Bay Counties District Council of Carpenters and the San Francisco Builders' Exchange.

The method employed in recording trade information items represents a contribution to the technique of job analysis. Each job as it occurred in production order was listed on a 3 x 5 card. Duty items, notes relating to skills required, and essentially related technical information, were all noted on the job cards. Jobs calling for the same kind of skill, knowledge and tools were grouped together as units or blocks. Jobs that made up a unit were arranged in instructional order.

"The listing of the jobs, their division into units, the arrangement of the jobs in learning order—first by a determination of checking levels with their type job specifications and objectives, and second by sorting the jobs into their proper levels—and finally the determination of the minimum knowledge required to do the type of work in each level completed the analysis of the house carpenter's trade." The order of units that seems best for instructional purposes is; (1) Roughing-in, (2) Exterior Covering and Finishing, (3) Roof Framing, (4) Interior Finish, (5) Stair Building, (6) Foundations, (7) Saw Filing, and (8) Estimating.

Objectives are stated for each unit. For example, in "Roughing-in" it is proposed to develop "ability to: use skillfully, take care of, and sharpen all the tools necessary for the roughing-in unit; read and take off all dimensions necessary for laying out and constructing from plans or sketches; construct, locate, and line-up all material necessary for roughing-in; and make proper allowance for all openings." By working through this unit the student is expected to acquire, "knowledge of: various types of framing and value of each; allowance for openings; allowance for waste; methods employed in framing partitions in ordinary house construction; methods employed in framing ordinary joists; quality and quantity of material; sizes of nails needed; city regulations regarding framing; the sizes necessary for roughing-in plumbing work."

To accomplish the major objectives five levels of jobs are recognized in each unit. For each job there are presented type specifications, minor objectives, trade mathematics, trade drawings, trade science and auxiliary information.

Mr. Stier has made a significant contribution to the science of Vocational Education, using job analysis technique in attacking his problem. He provides an instruction course in which consideration is given to the order of difficulty of the "learnings" involved. He has given thought to the interrelationship of the factors that make up skill and efficiency in the house carpenter trade, and, he has provided for the inclusion of helpful related subject matter.

EMPLOYEE VACATION PLANS

Report of Survey by Industrial Relations, Bloomfield's Labor Digest. Bloomfield and Bloomfield, Boston, 1923, 23 pp.

REVIEWED BY E. G. STOY

The reviewer has been impressed with the fact that many business and industrial concerns are reticent about adopting any new plan even when a decided need for it is recognized. Perhaps this condition is present primarily on account of a lack of information upon which to base a really good plan, i.e., the new plan is necessarily considered an experiment, or in some cases a pure gamble. If these managers who are continually confronted with dilemmas, and who often postpone plans indefinitely could but make a study of the tried and proved methods of others, there is little doubt that they could then adapt to their own needs suitable parts of the proved plans and do it with confidence. But this sort of information is not easily obtained. It is sometimes possible to obtain information on one or two cases, but this is not often complete or entirely relevant.

Vacations with pay for office employees is not a new idea, but only quite recently has the practice been instituted of granting to factory employees vacations with pay. The authors of this valuable report have compiled information on this subject, covering one hundred and twenty-one plans which have been proved satisfactory. It is just such information as this, showing a number of plans in diversified lines of business, that is needed for the use of those managers who are uncertain as to what system to adopt or whether to adopt one at all. In addition to a tabulated summary of these plans the reader finds a detailed account of each one. In most cases the name of the company is included, along with the total number of employees in the concern, the number affected by the plan, the date of adoption of the plan, and the details of it. In each case the system for office employees is included for comparison with the factory system.

It seems that the managements of the concerns from whom this information was obtained are, with few exceptions, pleased with the results, and it is noteworthy that the reasons given for their establishment vary a great deal.

THE TWELVE-HOUR SHIFT IN INDUSTRY

By the Committee on Work-Periods in Continuous Industry of the Federated American Engineering Societies, 1922, E. P. Dutton & Co., ix + 302 pp.

REVIEWED BY FRANK B. GILBRETH

This book is, at the same time, a reference book, a text book and an interesting account of a phase of industrial development.

Those in the field of industrial development, and especially in the field of industrial relations, will keep it close at hand, carefully annotated, for constant reference. Students will study it from cover to cover, and the general reader can get the gist of the information carefully presented in the first 24 pages. Here the basis of the study is outlined, and a general survey given, concluding with the general conclusions of the whole inquiry, which the rest of the book elaborates.

The book is written under the direction of a committee whose name is descriptive of its function, with a foreword by President Harding. It consists mainly of two detailed investigations. One into all types

of industry employing the twelve-hour shift, except the iron and steel industry, —the other into the iron and steel industry itself. The first is made by Horace B. Drury, and the second by Bradley Stoughton.

The makers of the two surveys are both trained investigators, having a broad backgound of knowledge and training and the disinterested attitude of the efficient survey maker. Their training, their experience, and the method by which they have presented their data, all bear testimony to their scientific standing, and to that intellectual honesty which is so rare and so worth while.

The value of the book lies not only in the importance of the conclusion that it states, but in the method of attack upon the problem investigated, which is a model of efficiency.

The field investigators and the committee have gone into the investigation with the idea of finding out not only the existing status of "Twelve-Hour Shift in Industry," but its value, if any. This is not a volume of propaganda. It is an attempt to discover whether there is anything in the twelve-hour shift worth keeping; what the trend of development, as it concerns the twelve-hour shift in industry is, with an attempt to find out the trend of future development, as deduced from the facts discovered.

The book is extremely practical, and is based on a recognition of the fact that there is an enormous need for production, which is a controlling factor in the need for and value of the twelve-hour shift. It is practical also in its inclusion of many concrete illustrations, and in its method i.e., that of presenting the facts exactly as they are discovered and allowing the reader to deduce conclusions himself as well as have the investigator deduce them for him.

It will be a surprise to those who have not made an intensive investigation of the twelve-hour shift that so little accurate information was extant before this investigation was made. This makes the book of great value not only as an outline of present conditions, but as a history as well as a prophecy. It is also of value in that it includes the opinions of employers as well as employees, stating both with equal fairness.

It is, of course, a matter of prime importance that the book proves, as President Harding has summed up in the preface, "The Twelve-Hour Day and the type of worker it produces have outlived their usefulness and their part in American life in the interests of good citizenship, of good business, and of economic stability." And again, that the necessary changes from the twelve-hour day to a shorter working day "can be achieved without either economic or financial disturbance to the progress of American industry."

ENGLISH MANUAL FOR BUSINESS

By Robert Winternitz and Paul T. Cherington. 1923, A. W. Shaw Company. 96 pp.

Reviewed by Fredonia Jane Ringo

The "English Manual for Business" was compiled, according to the foreword, to meet the needs of "advertising and sales executives and business men generally" who are interested in "improving the quality of their written English." It was prepared for the Educational Department of the Associated Advertising Clubs of the World. The men chosen to do the work, Robert Winternitz and Paul T. Cherington, had had invaluable training for the task both as teachers and as business executives.

To fulfill the requirement of appealing to business men, the book was naturally organized and written in popular style. The person who picks it up is at once impressed with its short chapters which seem to encourage reading, whereas more formi-

dable-looking divisions might have the opposite result. The business man sees that he can go through the whole book in a very short time and can mark for review those points which he wants to study carefully. Undoubtedly the manual introduces and treats its subject matter much more interestingly than does the average hand-book of writing. It is distinctly informal. In many ways it is fresh and stimulating. Stated briefly, it is a book which establishes in the reader a desire to improve his English, and then proceeds to give him rather specific but not at all comprehensive suggestions for accomplishing this result.

The book is valuable to a person who has had good training in English, but who has grown careless in his application of what he knows. It is not an introductory course in punctuation or grammar or rhetoric. It does not pretend to be. The person who is looking for a reference book, even a very condensed one, will not find this volume helpful, but the person who needs something to spur him on in his endeavors to write correctly and forcefully and individually will do well to study the manual.

The books says a little on a large number of different subjects. Each of these subjects is important. Each of them is discussed in such a way that something of worth is contributed by the discussion. But at times the treatment seems too sketchy to be genuinely valuable. The book wastes no words. The chief trouble is that it never goes below the surface. To attempt to handle principles of rhetoric, fundamentals of grammar, and types of business writing within sixty pages is naturally a difficult task. It means unfortunate omissions and condensations or inadequate discussions. To be sure, a book to appeal to a busy executive cannot be very long or very technical. Under the circumstances, perhaps a certain amount of content must be sacrificed to brevity. Yet, on the whole, this manual seems to suggest too much and to supply too little actual information. The chapter on *Types of Business Writing*, for example, is devoted more to assuring the reader that he can write satisfactory letters and advertising copy and reports than to giving help in learning to write.

At times it is hard to tell why certain points have been included in the book and others have been omitted. This thought comes up particularly in connection with *A List of Common Errors and Faulty Expressions*. The mistakes which are treated are all serious enough to deserve space. The rules and the examples given are clear, but the list itself, even when brevity is of the utmost importance, seems inadequate. The section on punctuation is much less open to this criticism. The list of words frequently misspelled in business writing is well chosen. The section on connectives gives some helpful suggestions, though, having been quoted from a general study on prose style, it includes some words which are not suitable for business writing. The appendix, dealing with typography and proof-reading, is a valuable addition.

In spite of the limitations which have been given, the book has unmistakable merit. It is readable. It takes up live points and discusses them clearly. It wastes no time on non-essentials. It fulfills its purpose—it is a manual which business executives will find stimulating and helpful.

Abstracts

Cocoa Works Development, V. The Psychological Department. S. ROWNTREE, JR. The Cocoa Works Staff Journal, April, 1923, Vol. II, No. 3, pp. 101–105.

Discusses industrial psychology, its development, and its subdivisions—vocational selection, time study, and motion study. The value of vocational selection is in the reduction of waste caused by training workers ill-adapted for particular occupations. Time study is used as a means to arrive at standards of output. It is also used to localize responsibility for unsatisfactory output. Motion study aims to discover the easiest and most economical method of doing a certain piece of work. It not only studies the actual motives but also considers improvements in lighting, ventilation, workbench, and tool as effecting output.

The Source of Educational Objectives. STEPHEN S. COLVIN. School and Society, May 12, 1923, Vol. XVII, No. 437, pp. 505–513.

Education is directed learning. There can be no direction without a conscious mind setting before itself an aim or purpose.

To understand the human mind as a human mind, we must understand it from the standpoint of aim, purpose, interest, intent. Education has always set before itself purposes. Whence have these purposes, these objectives, come?

Religion has been generally closely associated with education and its ideals have at times largely determined educational objectives. Hence these objectives have been looked upon as sacred, unchangeable and eternal. However, the objectives determined by religion are partial, one-sided, and too inelastic to permit their absolute acceptance.

Recently we have witnessed a re-emphasis of the state as the final source of educational objectives. The teaching of "patriotism" is urgently demanded and the individual is thought of in terms of his value in contributing to the national life. Sometimes this idea of the individual as merely an instrument for the realization of the purposes of the state, has resulted in turning the schools into means for the attainment of a narrow and selfish nationalism. The children of the American people must be educated in a common school, supported by the entire people and attended by the children of the entire people. We must fashion our education on the basis of our common understandings and agreements, not on our misunderstandings and contentions.

When Rousseau changed the emphasis in education from conformity to the adult standard to that of the child, he set the scheme of things educational topsy-turvy.

Neo-Rousseauism finds its chief exemplification today in the project method (the supreme expression of purposive activity as some would have us believe). What has happened here is not difficult to understand. It has been clearly seen that the project, the purposive activity, is an important if not a necessary means in many instances of reaching worth while educational results, and then all of a sudden, results have been forgotten in the insistence on means. What has taken place is that means have themselves become ends, methods have become objectives, and the sum total of the educative process is expressed in a type of activity that in itself is both method and aim, means and objective.

The objective determination of educational values by the use of statistical methods is illustrated in connection with the present widespread movement to measure educational products through standard tests. These educational scales and measurements have been largely derived

from a study of the achievement of school children under present conditions. It is found that the median performance of children of certain ages and certain grades is this or that, and this performance is taken as the desirable achievement without any further validity than that offered by the test results themselves. Thus the safe way of procedure is being entirely reversed.

Tests are valuable only in so far as they measure the achievement of a worth while educational end already established. They are grossly misleading and even dangerous when taken as educational objectives.

Educational objectives must be determined from within by a sound philosophy of education. It is the business of a philosophy of education to evaluate human experience and to discover those values most significant in human attainment and progress. In evaluating human experience, it must make certain necessary assumptions among which the following seem to be particularly important.

1. The final aim of education is to adjust the individual to his environment, not only present and real, but future and ideal.

2. The way in which the child is to be adjusted to reality is by teaching him the truth in regard to reality, and by inspiring him with a desire to find the truth.

3. Since truths vary greatly in their human values, the philosophy of education must select among these many truths, those that are most significant and practical.

4. The great instructive tendencies have an intrinsic value that must be recognized. Any scheme of education that does not give place for these eternal values, either actually or vicariously is incomplete.

5. Education must be largely the transmission of the culture of the adult generation to that of the child.

6. Those things that are most valuable in human life, that contribute to sympathies and understandings, that stand against narrow prejudices and blind hates.

7. Human freedom is necessary for real living. Educational objectives must lead to the development of individuals who can live their lives in self-restraint and mutual coöperation, free from petty laws and artificial social restrictions, who shall be laws unto themselves not because they are above law, but because they have comprehended and intelligently accepted the fundamental laws of human nature and society.

These great truths of human life and experience when recognized and comprehended must be the final objectives of education.

The Influence of Public Sentiment Upon Education. WILLIAM OXLEY THOMPSON. School and Society, April 7, 1923, Vol. 17, No. 432, pp. 365.

Direct attention to the growth of public sentiment in the support of an adequate educational program and points out some of the characteristic features of education in the Middle West resulting from this public sentiment.

The winning of the West, which constitutes so important a place in the history of the last half of the nineteenth century was marked by a very general and widespread interest in education on the part of what we commonly call the plain people. The ordinary farmer and the ordinary business man of small possessions were ardent believers in the efficiency of the great free public school system.

The same ardent advocacy was found in the realm of higher education. The people were persistent and emphatic in their belief that a state university should furnish to all the youth of the state an opportunity to complete a broad and generous education that should not necessarily be dominated by the classical education or religious sectarianism, but would be dominated by a hospitality toward all justifiable types of education.

Coeducation was accepted upon the broad principle that a publicly supported institution should provide facilities for its youth of both sexes.

The atmosphere of freedom so characteristic of the middle western education, encouraged a ready acceptance of the elective idea in education and soon developed vigorous discussion as to the educational value of the subjects introduced. The obvious result of the elective

system was to broaden the curriculum. The demand of the people in the West was persistent for greater liberty. They urged the introduction of these subjects because they believed them not only to be practical in themselves but to produce practical results in the educated person and in society generally.

The public sentiment of the West raised very definitely in all the public schools and the university the issue as to the moral responsibility of the school and the moral quality of the educated men and women. The people believed the school to be a social institution in which learning should make its contribution to the highest ideals of citizenship.

It was easy to persuade people that when public facilities were offered they should be utilized. The fundamental reason was, of course, that these educational facilities were offered (1) to promote the general welfare, (2) to develop an intelligence that should be discriminating and reliable upon the issues before society, (3) to lay a foundation for citizenship that would assure us of a stable government and inspire within us a reasonable hope of a well-ordered society.

The effect of this state of mind produced a rapid development of the high school. The first obvious result of this development of the high school is a raising of the average intelligence of the community. A second obvious result is a greatly increased list of possible freshmen for all the colleges and universities.

Public sentiment believes that boys and girls should be commended and encouraged in their ambition to go to college. But some of the university faculties are striking a discordant note. We are told that too many students are going to college. The proof of this is not found in any evidence that a college education is inimical to public welfare but rather in the fact of the alleged incapacity of many students to meet the requirements set up by university authorities. The justification of the protest relies upon the thesis that scholarship is the aim and end of education and that it is better to educate a few competent than to attempt to educate great masses of mediocre young men and women. But the academic world has lost sight of the prevailing belief of our citizens in the possibilities of the so-called mediocre person. The tendency either to limit the facilities for higher education or the number of people who may avail themselves of these facilities will not meet with the permanent approval of public sentiment. The American idea that every person should have an opportunity for improving his status in society will demand the facilities for this improvement.

There is no way by which society may be protected against the evils and sophistry of the appeal to passion except by the aggressive influence of thoughtful educated men and women. There is no institution that so prepares men and women for this service as does the college and university. The social responsibility, therefore, of the college or the university must not be overlooked in our zeal in the pursuit of academic ideals.

Apprentice Training in the Austrian Metal Industry. Dr. Fritz Rager. International Labour Review, April, 1923, Vol. 7, No. 4, pp. 632–636.

Describes efforts at apprentice training in the Austrian Metal Industry which grew to large proportions during the war. In general, the distinguished feature of Austrian industry is the great predominance of the small craftsman and therefore the survival of the old apprenticeship in which the boy was trained by his master. These masters often lack technical training and teaching ability and are apt to want to make profit out of their apprentices rather than to teach them. The craftsmen's associations have endeavored—usually without success—to remedy these defects by such measures as certificates of proficiency, examinations for master craftsmen, travelling industrial instructors, etc.

The Austrian Factory Act of 1907 requires the owner of every industrial concern to allow all his employees to attend the industrial and vocational continuation schools until the end of their eighteenth year. The vocational schools in which theoretical instruction is given to supplement practical

training in special apprentice workshops have proved more successful than the general industrial continuation schools, which are intended to continue the general school instruction and there is a growing movement to convert the latter into the former.

War industries absorbed many of the young workers who would otherwise have gone into skilled trades; they received little or no instruction and there is now a shortage of skilled workers. Also, apprentices trained in small concerns are not qualified for employment in large power-driven factories. Therefore, many of the large concerns especially in the metal trades are training their own workers.

Three types of training are distinguished:

(*1*) *Group training system.* One or two apprentices are put in charge of a skilled adult worker in the factory.

Disadvantages are: (1) that the adult worker receives no special pay for training the apprentice and is apt to try to keep him as long as possible when trained; (2) that the young workers are usually employed without a contract of apprenticeship.

(*2*) *Factory apprentice shops.* (a) Apprentice workshops which are only distinguished from other departments in that only apprentices are employed.

(b) Apprentice shops where the learners do not work on production goods but make articles solely for purposes of training.

(*3*) *Apprentice shops and work schools.* Three large automobile or cycle factories have established work schools which take the place of the state continuation schools as well as apprentice workshops.

Owing to the poverty of Austria, the establishment of state apprentice workshops is at present impossible.

Foremanship Training in the Medium-sized Plant. HAROLD MOORE. Industrial Management, April, 1923, Vol. LXV, No. 4, pp. 214–215.

Discusses the results of a foremanship training course in the Corning Glass Works. It was decided that foremanship training was desired for foremen, department heads, submanagers, cost and accounting men, engineers, draftsmen and others. A course fundamental to all factory production and furnished by an organization specializing in such courses was selected. Two-hundred and fifty men enrolled for the course. Half the cost of the course was borne by the company and the other half by the individual. Provision was made that if the individual passed the course with a grade of 75 per cent or over the company would pay for the complete course. Fully 99 per cent of the test papers were returned and a large majority of the men obtained ratings of "B." So much interest was aroused that after the completion of the course a Production Club was formed to carry on further study. This club is now one of the livest organizations within the company.

Relation Between Labor Turnover and Industrial Accidents. HARRY D. KITSON AND CLAUDE CAMPBELL. The Journal of Industrial Hygiene, July, 1923, Vol. 5, No. 3, pp. 92–96.

The report of the Commission on Elimination of Waste in Industry, of the Federated American Engineering Societies, revealed that in 1919 there were 3,000,000 accidents which caused at least one day's disability and which cost $1,014,000,000.

It is coming to be recognized that some of the more obscure factors causing accidents may be discovered most easily through correlating accidents with occurrence. Some of these obscure factors discovered by such a method are speed in production, fatigue, and inexperience of beginners.

Chaney discovered that the curve representing the number of accidents follows in shape the curve representing the number of new accessions to the working force. He found that the accident rate was 37.1 per 1,000,000 hours' exposure, for employees with less than six months' service; 14.1 for those with three to five years' service; and 2.8 for those with ten to fifteen years' service.

The study made here was based on data for 30,000 accidents which occurred in 1921 in four industries—automobile, cutlery, railway cars, and coke and gas.

The data showed a ratio of accidents for new men four times as great as the ratio of accidents for the total number employed, and the curve of accidents followed the curve of new accessions. These results hold true for individual firms as well as for the total.

Although there are undoubtedly sources of accidents other than new employees, yet none of the others now recognized seem to show such decidedly close correlation.

"Practical steps that suggest themselves in the light of these findings are:

1. In order to reduce the number of accidents, reduce the turnover. If the number of new employees could be reduced to zero, the number of accidents would probably be reduced by 75 per cent.

2. When the costs of turnover are being computed from such items as spoiled work, damaged machinery, etc., a percentage of them should be computed from the amounts paid in settlement for accidents.

3. An increased amount of time spent in instructing new employees might aid materially in reducing the number of industrial accidents.

How Personnel Work Reduced Street Car Accidents. National Safety News, June, 1923, Vol. 7, No. 6, p. 22.

Reports the results of accidents prevention work done by the Cleveland Railway Company which reduced the number of fatal accidents to pedestrians from 16 in 1921 to 5 in 1922—a saving of 11 lives.

"Our accident prevention work is entirely internal," says Victor T. Noonan, Superintendent of the Accident Prevention Department of the company. "We have had no educational work for the public in cars or otherwise. The Cleveland Railway Company thus far, has confined its accident prevention work to its own organization. We have found from experience that this method does bring results."

Each motorman and conductor is made to feel that the inspectors are his friends, who are on the job to help him in protecting the safety of the public instead of merely looking for trouble. A card index is kept of each employee covering all personal details and his accident record. All accidents are investigated as to their causes and the employee does not feel that he has been judged and condemned before he is given a chance to explain. This friendly attitude on the part of the management encourages the employee to be frank instead of resorting to fake alibis. He goes back to work determined to live up to the company's confidence in him and it has never been found necessary to discharge an employee for repeated negligence.

The company has worked in close cooperation with the police department, the local safety council and the Cleveland Automobile Club to facilitate the movement of traffic and in preventing accidents.

Mental Factors in Accident Prevention. Dr. William R. Woodbury. National Safety News, May, 1923, Vol. 7, No. 5, pp. 25–27.

Reports that the human factor in accidents, both before and after the injury, is one of the greatest problems confronting the industrial relations department. Effective service in lessening human waste in industry comes only through coöperation between the safety engineer and the industrial doctor. The mental factors which develop from accidents reveal the directions in which to search for new knowledge as to their prevention.

An understanding of the mental causes is of inestimable value, as an aid to the recovery of the victim and the prevention of future accidents. All told there are fifteen major mental causes of casualties, which sum up the entire field of mental error, viz.: ignorance, inexperience, mental limitation, predisposition, faulty attitudes, mental sets, excitability, subconscious errors, faulty habits, inattention, distraction, preoccupation, mental sickness, depression, and sickness.

Standardization of Traffic Signal Colors. Science, May 11, 1923, Vol. 57, No. 1480, p. 550.

Forty-two men, representing the manufacturers and users of traffic signals, federal and state governmental departments, associations interested in the prevention of traffic accidents and representatives of the

general public, are now at work on the drafting of a national code on the proper colors for traffic signals, which it is expected will not only cut down the annual loss of life through traffic accidents, but will eliminate many of the existing irritations to motorists and to the operators of steam and electric railways.

This work is being carried on under the auspices of the American Engineering Standards Committee, whose approval of a code or standard insures its ultimate acceptance and observance throughout the country. The American Engineering Standards Committee is composed of seven departments of the United States Government, the principal technical, industrial and engineering societies and individual business concerns interested in standardization.

How a Local Industry Teaches Safety to the Community. National Safety News, April, 1923, Vol. 7, No. 4, p. 15.

Cites case of safety as a community idea in a town of 2000 population, composed mainly of employees of a paper mill. Just prior to the last safety contest with another company mill, a banquet was held which was attended by the school faculty, business men, village board, mill supervisors, professional men, church societies, and lodges. The town was flooded with safety posters and stickers, and other publicity was employed to arouse interest. The mill won the two months' contest and continued without accident for eighty-five days. No accidents have occurred in 1923. The village has bettered the mill record as not one accident is on record since last October's rally.

Industrial Dental Service. G. H. Hickman. Welfare Work, April, 1923, Vol. IV, No. 40, pp. 63–65.

Reports the need for industrial clinics and the dividends received in the improved health of workers, the saving of time, and the increased efficiency of labor in plants having dental clinics.

Costs and methods of Administration are also dealt with.

Sanitation and Sanity. Haven Emerson, M.D. The Survey, May 1, 1923, Vol. L, No. 3, pp. 129–131.

Reviews the advances in sanitation made in the period from 1873 to 1923. These improvements have become possible largely by the concomitant development of an elaborate "so-called technique of approach to the public." After enumerating the physical handicaps to be overcome in the future, mental health is treated. This has been disregarded in the past and consequently is the chief obstacle of the future. Psychology and psychiatry will lead the public to mental health as physiology and bacteriology have given the means of protecting bodily health.

Creation of a Workers' University. Welfare Work, April, 1923, Vol. IV, No. 40, p. 69.

Reports the meeting of a number of well-known scientists, literary men, representatives of university, social, occupational and political associations, and several deputies belonging to the Socialist party at Warsaw to discuss a draft constitution for a workers' university.

According to the text adopted, the objects of the workers' university are:

(a) To organize systematic courses of lectures on various branches of art and science.

(b) To organize courses of general and vocational instruction.

(c) To organize reading rooms, libraries, museums, laboratories, exhibitions, scientific meeting sand excursions, sports clubs, dramatic performances and concerts.

(d) To publish and sell popular editions of literary and scientific works, students' manuals, etc.

(e) To purchase premises to be used as theatres, cinemas, clubs, hotels, etc., and to maintain such institutions.

(f) To support child welfare organizations and assist all individuals or organizations engaged in activities similar to its own.

The headquarters of the University will be at Warsaw, but its activities will cover the whole country. It will be under the control of a Board of Governors consisting of 15 members.

Workers' Education. SAMUEL GOMPERS. American Federationist, May, 1923, Vol. XXX, No. 5, p. 385.

Reports the work of the Workers' Education Bureau which is seeking to supplement the work of established schools and colleges by giving to workers who could not attend these institutions a chance for an education. It aims to help those wage-earners who were penalized because they were poor, who were denied education because they could not go where education awaited them, and hopes for the day when special efforts such as this to provide adult workers' education may not be necessary.

Work Magazines. A. S. COLE. Welfare Work, May, 1923, Vol. IV, No. 41, pp. 85–86.

Reports a classification of "house organs" and discusses at length that type of publication which is written by the employees for the employees actually within the four walls of the business. This kind, and this alone, in the writer's opinion is the only works magazine which can be regarded as justifying its existence.

Our Labor Shortage and Immigration. HON. JAMES J. DAVIS. Industrial Management, June, 1923, Vol. 65, No. 6, pp. 321–323.

Makes manifest the need of more careful selection of immigrants as to both quantity and quality.

A scientist who has made a thorough study of American mental standards estimated that if the mental tests applied to the American army during the world war had been enforced against the foreign-born now in the United States, and all showing a mental level below a standard fixed between low average and inferior intelligence had been excluded, 45.6 per cent of the 13,920,692 foreign-born now in the United States, or 6,347,835, would have been barred.

During the last thirty-three years America has accepted 14,000,000 aliens of all types to acquire about 7,600,000 who are classified as low average intelligence or above.

The three per cent act, which limits the number of immigrants who may enter from a given country in any one year to three per cent of those who were in America at the time of the taking of the 1910 census, places no restriction on immigration other than through the Chinese Exclusion Act, and literacy test provisions of the Act of 1917.

The three per cent act has reduced immigration from Southern Europe and the Near East fifty to eighty per cent, but has not affected the number accepted from those countries in Northern Europe from which America originally received its people. It so happens that through the enforcement of this Act the Japanese and Chinese are the races now most favored under our immigration laws.

"The greatest fault with the present system is that it gives the privilege of selection of immigrants to the sovereign powers of other nations. . . . . There has always been some controversy as to whether this power was fairly executed, but as to this, I have no competent information."

The percentages of those immigrants who have become naturalized run from 74.4 per cent for the Welsh down the scale to 5.5 per cent for Mexicans. Provision should be made for registration of the alien after his admission, for this would be beneficial both to the alien and to the Government.

The Secretary of Labor has ready for introduction at the next session of Congress a bill providing for the examination of *prospective emigrants* through the use of the following tests: blood, physical, mental, and character. The last named test provides for an investigation of the *prospective emigrant* in his own community.

The possibility of moving the examining machinery to foreign countries is now being considered in order that an applicant for admission may not have to spend the savings of a lifetime on a long sea voyage in order to find out whether he may enter the United States.

Industrial Profits and Labor Shortage. W. RANDOLPH BURGESS. Management and Administration, July, 1923, Vol. 6, No. 1, pp. 25–28.

Explains the existence of three situations in industry which are apparently antag-

onistic, yet certainly exist according to economic data which was obtained from reliable sources and checked against individual industries. These three situations may be stated as follows:

1. Factory output is equaling, or exceeding, all previous records.

2. There are 10 per cent fewer workers employed in industrial establishments than in 1920.

3. There is an acute shortage of industrial workers.

In answer to the question as to where the 1920 workers have gone, and it may be stated that many have shifted to the building trades. The current rate of contract awards will require three times the volume of construction in 1923 that was seen in 1920. Other factors entering into this problem are the movement of women out of industrial work into sales and clerical work, and the noticeable lifting of the age at which young people enter industry, caused by a longer period of school attendance.

How has it been possible to turn out more work with fewer men? One reason is that high wage rates have caused the manufacturer to cut his wage bill per unit of output. Also, the present labor shortage has necessitated increased efficiency.

Methods which have resulted in increased efficiency may be summed up as follows: "In the first place, the industrial depression of 1921 resulted automatically in an increased efficiency, because the workers were anxious to retain their positions; in the second place, efficiency has been increased by improved management which has studied work processes, cut out unnecessary steps, and given workers better training for their jobs; in the third place, more incentives have been offered for efficient work in the form of special bonuses, or changes in methods of wage payment; and in the fourth place, labor-saving machinery has been adopted. A number of concerns have adopted the practice of installing labor-saving devices even if there is no saving in money, in order to release employees for other work."

A tabulation recently made by the Federal Reserve Bank of New York indicates that representative industrial concerns showed profits in 1922 three times as large as those of 1921 and which approached closely those of 1919 and 1920. Today, however, the manufacturer must keep the selling price of his product within the range which the consumer will pay, in face of rapid increases in the prices of raw materials and labor. The situation is further complicated by the fact that the incentive to efficiency which prevails in a period of unemployment has disappeared.

"The manufacturer today is confronted with a problem of management, in some ways more serious than any he has had to face since the Civil War."

In the past 80 years wages have been moving upward almost continuously while the trend of prices has remained practically level over the same period, with the exception of the two war periods.

Over a span of years in the future we may expect an increase in factory efficiency such as will make possible high wages and a high standard of living for the worker, along with a reasonable level of prices. This will be possible through the application of principles already proved valuable,—quantity production, labor-saving devices, and arrangement of working conditions to enjoy a maximum output for each worker.

The Trade Union Movement. International Labor Review, June, 1923, Vol. 7, No. 6, pp. 880–885.

Evidence of closer relations between American miners and the International Miners' Federation was seen in the expressions of both sides at a meeting of the Committee of the Miners' International which was held at Brussels on April 10 and 11. The United Mine Workers of America were represented by their President, who put forward at this meeting a resolution on international action in case of strikes, advocating the cessation of coal exports to the country in which the strike occurs. This was unanimously adopted. Further evidence of this growing solidarity was seen in a resolution of the Belgian miners which was passed at their last annual congress in Brussels on March 17 and 18, to the effect that "the International Miners' Federation

should make untiring efforts to secure the adherence of trade union organizations in countries possessing a mining industry, and should render the relations with the United States more effective. . . . ."

In Germany the Federal Economic Council approved at its December session (1922), a Bill which fixes the legal working day in the building industry at nine hours during eight months of the year and reserves the possibility of allowing overtime when necessary. The executive committee of the building unions have protested that they should be free to regulate conditions of work through collective bargaining and have succeeded in having the terms of the Bill modified in favor of labor by the Committee of the Council on Social Policy, but the majority of the Federal Economic Council pronounced itself in favor of the employers' proposals.

On March 16 a Decree establishing the eight-hour day was issued in Italy. This Decree has received the unreserved approval of the Fascist organizations. However, it is contended by the employers in the building trades that the workers cannot work as much as 300 eight-hour days in a year on account of seasonal influences, and for technical reasons. The workers' federation believes in the decree and insists that the agreements in force be retained.

In Belgium the National Joint Committee granted to striking miners two wage increases of 5 per cent each on February 18 and March 18, in conformity with the national agreement fixing the wages of miners in accordance with variations in the cost of living.

In France there are movements for the readjustment of wages which are general in the various branches of industry. The National Federation of Seamen demands that there be a return to the wages in force before the agreement of June 22, 1921. The textile workers are negotiating for increases in wages; a strike is reported in the northern district. Printing workers have received a temporary bonus based on the official index numbers, to compensate for the increased cost of living. The National Committee of the General Confederation of Labor and the Association of Trade Unions of the Seine have passed resolutions inviting the unions to carry on a press campaign to make known to the public their views on the causes of the high cost of living; that is, that the cost of living is due to speculation and to internal and foreign policy and not to increased wages or the eight-hour day.

In Great Britain a conflict arose between the workmen and the farmers of Norfolk County when the latter reduced wages from 6d. to 5½d. per week. A tentative agreement was reached on a guaranteed minimum wage of 25s. per week for 50 hours' work. The principal issues of the dispute in the building industry were referred to a special arbitration panel. The National Union of Railwaymen has publicly stated that it will not accept the companies' reduction of the war bonus of 6s. 6d. per week, and will call a strike of all railway grades if necessary.

The tendency to form new unions is spreading. The total membership of the organizations proposed to comprise the United Cloth Hat and Cap Makers' Union in the United States is estimated at about 400,000. The Christiania (Norway) Congress adopted a plan for the reorganization of trade unions. In Italy there has just been created the National Corporation of Salaried Employees. This organization has about 100,000 members and is divided into five sections: civil servants, employees in charitable and public relief institutions, bank employees, insurance employees, and commercial employees.

Child Labor Outlines for Study. U. S. Department of Labor. Revised Edition, Bureau Publication No. 93, 63 pp.

Presents in six sections the outstanding features of the child labor problem: 1, History of the movement for the prohibition and regulation of child labor; 2, Present extent and distribution of child labor in the United States; 3, The causes, social cost, and prevention of child labor; 4, The present legal status of child labor in the United States; 5, Vocational education and vocational guidance in the United States; 6, Mininum standards for children entering employment.

1. In medieval times, even though children may have been employed at as arduous tasks and for as long hours as were en-

countered under the factory system of the early nineteenth century, they were nevertheless more fortunate in medieval times, for the apprenticeship system established in the thirteenth century imposed strict regulations for their benefit.

The development of the factory system in England in the eighteenth and early nineteenth centuries brought a change for the worse through the abolishment of the requirements for technical training for apprentices, and through an increased demand for cheap labor, with no regulation of working conditions. Legislative reform was started in England in 1819, but was very slow. In 1833 an act was passed limiting ages and working hours in textile mills and providing for the first system of factory inspection. From 1845 to 1878 legislation regulated the age and hour standards for all manufacturing industries. From 1878 to the present time legislation provided, in the main, for raising age, hour, and educational standards for children in all occupations.

In the United States, prior to the establishment of the factory system, child labor was very common and was considered morally desirable and economically necessary. Exploitation of children at the expense of their health and education followed the advent of the factory system, but not to so great an extent as was the case in England. Prior to 1860 eight States had passed laws regulating working hours, and six of these eight States had passed laws providing for the education of working children. Up to this time only a few laws had been passed regulating ages at which children might be employed, and these contained inadequate provision for enforcement.

From 1860 to the present time legislation has tended toward raising the minimum age limit from 10 and 12 years to 14 and 16 years in all occupations and in most States. Further provision has in this time been made for the education and working hours of children, and certain minimum health conditions have been set. From 1906 to the present time many bills have been introduced in Congress for Federal legislation, but only two of these have passed, and they were both declared unconstitutional by the United States Supreme Court.

The First, Second, and Third International Labor Conferences, held at Washington in 1919, at Genoa in 1920, and at Geneva in 1921, and the Berne International Conference of 1913 recommended measures on working hours, age, and occupations for child labor which have been ratified by a number of foreign countries.

2. At the Fourteenth Decennial Census (1920) there were reported over one million (1,060,858) children, 10 to 15 years old, who were earning wages. The majority (61 per cent) of these children were engaged in agricultural work and thus were not subject to regulation, either State or Federal. The compulsory schooling laws, although an indirect means of regulation are inadequate.

Clerical pursuits, trade, transportation, professional, and public service are the occupations usually regulated by State Child Labor Laws, but not by Federal laws. About 15 per cent of the working children 10 to 15 years old are engaged in these pursuits. Manufacturing and mechanical work, in which we find 17.5 per cent of the children 10 to 15 years of age, are regulated for child labor by both State and Federal laws. Mining is also thus regulated, and in this field we find 0.7 per cent of the total.

3. "Poverty and ignorance are both the cause and the effect of child labor. Although a large proportion of the children who go to work as soon as the law allows give dissatisfaction with school as the direct cause, nevertheless it is chiefly in homes where poverty, past or present, has caused a low standard of living or ignorance of the value of education that this dissatisfaction results in the child's leaving school for work. Physical deterioration, moral defect, and industrial waste, as well as poverty, result from premature employment. While the enactment and the adequate enforcement of good child labor and compulsory school attendance laws are essential to the proper protection of children against industrial exploitation and loss of educational opportunity, adequate family incomes and an educational system

satisfactorily adjusted to the needs of adolescent children are prerequisite to the solution of the child-labor problem."

Investigations indicate that the chief causes of children entering industry are poverty and dissatisfaction with school. Children with no marked intellectual tastes are not provided for in the upper grades of many schools where the training is chiefly designed for intellectual pursuits.

Children employed during adolescence cannot gain normal physical development; they are more prone to accidents than adults, and they are more susceptible to industrial poisons than adults. This cost of child labor in underdevelopment, ill health, and deficiency in physical vigor must be borne by the child in low earning power and premature old age, by the employer in loss of efficiency, and by society in physical deterioration of the race.

A child of fifteen usually has no special training to qualify him for work at a skilled trade and consequently enters a blind-alley job, with disastrous results. This sort of work offers little opportunity for mental development and the child is soon in a rut.

The revision of our education system requires:

(a) More schoolhouses, better built and better equipped.

(b) More teachers, better trained and better paid.

(c) A revision of the curriculum so that every child may be given training best suited to his tastes and ability.

(d) The general introduction of vocational training in the school curriculum.

(e) Provision for part-time and evening classes in trade training, trade extension, and general education for workers of all ages.

4. "In all except three States, the minimum age for work at least in factories and often in many other employments is placed as high as 14 years, and seven States have an age minimum of 15 years or over. Thirty States provide an 8 hour day or 44 or 48 hour week for children under 16, and 40 prohibit their work at night.

"Few State laws apply specifically to work in agricultural pursuits or domestic service. Although a number of laws apply to 'all gainful occupations' and would therefore nominally cover farm work and housework, practically the only prohibition of these types of child labor is that which results indirectly from the operation of the compulsory school-attendance laws. Its effectiveness, therefore, depends wholly upon the strictness with which these laws are enforced.

"The provisions of the Federal laws affected only children employed in two occupational groups—the manufacturing and mining industries."

5. Vocational education, including the industrial, commercial, agricultural, and home economics forms, provides or should provide for making fit an individual for work in a particular occupation. It should overcome the necessity for a child's learning "on the job" in a haphazard way, thus increasing output, eliminating a waste of materials, time, and workers, and benefitting society through the worker's interest in the job.

The Smith-Hughes act was passed in 1917 to coöperate with the States in promoting vocational education. It provides for funds, restrictions on instruction, qualifications of teachers, types of schools and classes and age of students. Since the passage of this act most of the State legislatures have increased their appropriations, and during the fiscal year 1918–1919 the number of State supervisors and directors was increased to 105, as compared with 54 in 1917–1918.

Vocational guidance aims to help children to choose, under competent supervision, occupations suited to their tastes and abilities, thus eliminating the possibility of a child's taking the first job offered, only to become dissatisfied and and inefficient. A complete vocational guidance program requires (1) that the child be studied as to his abilities, characteristics and tastes through cumulative school records of scholastic, social, and physical histories; (2) intelligence testing; (3) try-out experiences in academic, esthetic, and commercial work; (4) spontaneous interest studies by teachers; (5) occupational studies. The final choice should be made by the pupil.

6. At a series of conferences on standards of child welfare the Federal Children's Bureau at Washington and a number of other representative cities grew up in May and June, 1919, and a number of standards as minima for children. These included standards for age, education, health and physique, hours of employment, employment certificates, compulsory attendance, factory inspection, physical examinations, wages, and placement and employment supervision.

Ideas in Management Series. IX. Committees—Part 1. The Cocoa Works Staff Journal, April, 1923, Vol. 2, No. 3, pp. 97–100.

Discusses the various types of committees, their purposes, their advantages, and disadvantages. Committees are of two general types—permanent and "Ad Hoc." A permanent or "standing" committee is a fixed piece of the factory organization while an "Ad Hoc" committee is one definitely set up for one single purpose. When this single purpose is accomplished the committee ceases to exist. Such committees give to the solution of an important question the benefit of many minds. Their disadvantages lie in the fact that they may cause executive officers to shirk the making of decisions, they consume much time and they may extend their activities beyond their limited scope. Permanent committees have the following general objects:

(a) To make decisions, i.e., executive committees.

(b) To advise, i.e., advisory committees.

(c) To educate their members, i.e., educative committees.

(d) To coördinate various interests, i.e., coördinating committees.

He's a Better Workman Now. Homer E. Niesz. System, June 1923, Vol. XLIII, No. 6, pp. 750–753.

Reports an experience with group insurance in the Commonwealth Edison Company of Chicago. The method of apportioning policies is: employees who have been in the service 12 to 18 consecutive months are entitled to policies for $500 insurance under the group life plan; those employed from 18 to 24 consecutive months, $750; 2 to 3 years, $1,000; 3 to 4 years, $1200; 4 to 5 years, $1300; 5 to 6 years, $1400; and those consecutively employed for more than six years receive $1500 insurance. Thus the value of the insurance is purposely graduated, increasing in value with length of service, and offering, because of this inducement, a logical reason for continuity of service.

Provision is made for employees to take out additional insurance under the group plan at normal rates.

The general plan was put over by placarding the offices and building with the benefits to be derived from group insurance, and the new plan was accepted by 75 per cent of the employees and is still in demand.

Through the weekly "house organ" the employees are told in detail of the circumstances when one of their number dies and his beneficiaries receive his insurance money, thus presenting an object lesson that accomplishes more in a few seconds than hours of abstract talk.

Smoothing out the Salesman's Temperamental Kinks. Charles Austin Bates. Printers' Ink, April 19, 1923, Vol. CXXIII, No. 3, pp. 33–36.

Discusses the failure of general sales conferences to rid the individual salesmen of their grievances. As soon as a sales conference begins the salesmen begin voicing their grievances. Mistakes of the office force are exaggerated, the activities of competitors are dwelt upon and the salesmanager must spend most of the time selling the house to its salesmen. A more effective method is to let the salesmen visit their manager when they feel the need or let them be called to the office visited in the field and either be given a pat on the back or a swift kick. The ideal salesmanager is not a driver but he is a philosopher, a 100 per cent optimist, and a practical psychologist. Psychology works better on a man-to-man basis than it does in a mass meeting.

Compulsory Information in Coal, A Fact Finding Agency. Issued by Nationalization Research Committee, United Mine Workers of America, 1922.

Indicates the absence of facts in the coal industry available to the general public

and by means of quotations from various speeches shows the hand of the coal operators in keeping these facts dark. For a proper solution of the coal problem a fact finding agency to determine the following should be established:

1. Investment costs, and profits.
2. Production, distribution, consumption, supply.
3. Accidents and mining methods.
4. Exports and imports.

The Main Business of Industry. ROBERT W. BRUERE. The Survey, May 1, 1923, Vol. L, No. 3, pp. 133–135.

Contrasts the Pittsburgh Survey made in 1908 with the Twelve-Hour Shift in Industry report made in 1922 by a committee of the Federated Engineering Societies. Both agree in many points regarding the continuous process industries. The later reports shows that many advances have been made in the amelioration of the grosser evils of irrational industrialism. Work accidents have abated, housing reform has affected the slums, health measures have been instituted and legislation passed which protects women and children.

Industry however is still failing to satisfy the human wants of those engaged in it and the wants of the consumers. The chief cause is the spiritual handicap of inferior status. Solutions of this problem have been made in isolated industries. The most outstanding example of satisfactory solution is that of the Columbia Conserve Company of Indianapolis.

A Trip Through the Phoenix Mutual Sales Department. DAVID H. COLCORD. Sales Management, March 1923, Vol. V, No. VI.

A general revision of selling plans in the Phoenix Mutual Life Insurance Company has enabled 450 men to write $50,000,000 in 1922 where it formerly required 1700 men to write $18,000,000. More calls per day, less time per call, low selling cost per order, the quick short arm punch in closing sales have made such a record possible.

Greater coöperation between the home office and the field is probably the key to this success. Last year the Phoenix Sales Promotion Department circularized 80,000 names and secured replies in 31 per cent of the cases. These replies were followed up immediately with a personal call with the result that 12 per cent of the prospects seen were sold.

Commenting upon the efficiency of the company's selling program, Mr. Winslow Russell says, "For years we have been working for greater efficiency and the rest of our proposal is submitted to our friends herewith. We propose that every man shall be given the opportunity to carefully train himself in the principles of Life Insurance Salesmanship. This has been worked out after years of experiment through an instructor and a field correspondent, with beginners and graduate courses and gives each man a systematic instruction which places him in a position to know exactly what he sells and why he sells it and the best methods of presenting the proposition. The grades of prospects are prepared at the home office for this daily work. For the beginner we are able to start an early production through carefully acquired prospects, thereby eliminating much wasted time and many discouragements. Our life income department supplies the specialist in this line with prospects for 10,000 and up cases. Our business insurance department places the large producer at once in touch with large prospects. Incidentally, we may say that we are collecting over a half-million dollars a year in renewal premiums as a result of this work."

The sales promotion department has a unique way of carrying on its work. After completing his home office training, the salesman is instructed concerning an efficiency staff to which he is eligible under certain conditions. When the salesman gets back to his territory he is told to carefully select the names of 100 prospects and mail them to the home office on a regular form. To this list we send a circular letter offering them a free desk pad if they return the inquiry card enclosed. The salesman is informed as soon as the inquiry card is returned and reports to the home office each week the calls he has made and the length of time spent in making each call. The desk pad contains a filler which is generally exhausted in about a month and

this gives the salesman a chance to make a back call with a new filler. Generally speaking, each salesman is entitled to 100 letters the first month, to another 100 the second month providing he has called on 50 per cent of the names returned to him—if he fails, he loses his right to the letters for one month. If a man writes more than $250 a month in premiums, he is entitled to more letters in proportion.

Last year the salesmen made 90 per cent of the calls for all inquiries returned. Each year the Phoenix gets more business from these letters at less cost. In 1916 it sent out 160,000 letters and wrote $2,000,000 and last year 80,000 and wrote $7,000,000.